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SOME SOURCES OF ERROR IN GENERA AND SPECIES.

KATHARINE BRANDEGEE.

Systematic botanists cannot be too often reminded that their work is essentially preliminary, that genera and species do not exist in nature, and that their object should be to supply, as soon as possible, a classification in which the determination of plants as to genera should be extremely easy. There would seem to be no good reason why it should not be so simple that the average child of ten could know the first name of most of the organisms belonging to his environment. The beginnings of the natural sciences, learned in the best way from Nature herself, are always delightful, a constantly enlarging new world opens to the observer, furnishing resources which diminish the temptation to less innocent pleasures in times of idleness. The door to these joys of Nature is difficult of opening because of the uncertainty of names. Observation is constantly checked because the result cannot be intelligently communicated.

The tendency at present seems to be to define as a species every organism which can, by any attribute however minute, be distinguished from its relatives. When by this process, which is essentially the description of individuals, a number of "species" have been accumulated, the next step is to "institute" a genus which shall include the group, which genus in very many cases is simply the equivalent of the earlier single species. The genera and species are in this manner made entirely inelastic, and the

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inevitable further variations can only find room by enlarging the scope of the genus until it again comes too near its neighbors. One of the trivial but annoying features of this attempt to make "natural" genera is found in the care of herbaria. Most of us, with some care, can put Aster into its genus covers, but which of us receiving a large number of forms could put them in place at once in Eucephalus, Dællingeria, Ionactis, Leucosyris, Leucelene, Heleastrum Machæranthera, Xylorrhiza, Oreastrum, Oreostemma? etc., certainly not the author of these genera who is continually shifting the species.

Genera which are thoroughly confluent would probably be more easily managed in sections than as a separate genera, as has been shown by the merging of Astragalus and Phaca, especially, as in a century from now the species of Phanerogams will probably be less numerous in spite of the new ones yet to be found. The small genera can continue to be merged, as they are better known, with their nearest neighbors by the simple means of omitting unnecessary detail.

A particularly objectionable kind of genus is the one which is founded largely on geographical considerations. These are only too apt to be based on wanderers, and are a source of uncertainty in phytogeography. These genera especially abound in Cruciferæ.

The flood of "new species" in which American botanists are now almost engulfed shows no signs of abating, unless it may be one, that some of the most prolific show signs of discord and begin to discredit each others work. One can have small hope of checking the progress of botanists whose whole aim is the creation of as many species as possible, but I, nevertheless, venture to call their attention to a few elementary facts which some of them seem to have forgotten.

1. *Although most plants are fixed to their place of growth, their seeds may be widely dispersed.*

This would seem to be quite sufficiently obvious, yet forgetfulness of the fact has caused the re-describing of a host of plants, which as years go by slowly find their proper places. The dispersion of species is often attributed to the ice age, in

apparent forgetfulness of the lapse of time involved in geologic periods, which are certainly long enough to quite preclude the possibility of the survival of any species then existing, while it is quite impossible to grant that evolution acting under different environment in widely separate regions will produce identical organisms. Nature works, as has been well said, along lines of least resistance, and certainly the line of least resistance here is the dispersion of seeds by some of the numerous agencies that are known to be competent. As this introduction and interchange of plants has taken place in the past so we find it now, but at a greatly accelerated rate, owing to the much more rapid and frequent intercourse.

How shall we know whether a plant like *Erodium cicutarium* or *Bowlesia lobata* is indigenous, or not very remotely introduced? By the locality where its variations abound, not by its numerical abundance, for it is a curious fact that Eurasian weeds seem to have become hardy under adverse circumstances and developing under more favorable surroundings to a sturdier growth drive out the feebler native plants.

It does not necessarily follow because a plant was first described from a given region, that it was there indigenous. It may well be doubted, for instance, whether Agrimonia or Xanthium are indigenous in North America; certainly, although widespread, neither of them are so in California.

Plants which are of annual or biennial duration, especially those growing along the coasts, or in wet places, and belonging to groups which find their chief development in distant regions, should be rigorously scrutinized, and if possible compared directly not only with the less-known species of the genus, but also with those of the neighboring genera, in some one of which it may have been already doubtfully placed. A recent example of this is to be found in *Howellia limosa*[1] which appears to have been at least once described before.[2] Of course this does

(1) Greene, Pitt. ii. 81.

(2) *Mezleria ? valdiviana* Ph. M. ? glaberrima; caule simplicissimo, debili; foliis oblongis, sessilibus, obtusis, apicem versus utrinque 2—3-denticulatis, omnibus ex axilla floriferis; floribus minutis, albis, petiolum æquantibus; laciniis calycinis triangularibus, dimidiam corollam nec non filamentorum columnam æquantibus.

Habitat in stagnulis prov. Valdiviæ; detexit filius Fredericus.

Caulis interdum pedalis vix ¾ lin. crassus, e parte inferiore radices filiformes seu

not invalidate Gray's genus Howellia, which may however be the same species, its emersed fruit being still unknown, or it may be one of the obscure aquatic Lobelias.

The small annual Lobeliaceous and Campanulaceous plants seem to possess a high degree of variability. The type of *H. limosa* had expanded corollas, but in the numerous specimens I have seen growing the flowers were cleistogamous.

Campanula exigua,[3] which must be very near *C. Reverchoni*,[4] of which the mature fruit was not known, belongs to a group of small annual Campanulas which have their home about the Mediterranean. It is almost certainly an immigrant, may even be *C. Lœflingii* Brot., of which I have seen only an imperfect specimen. The recently described *C. angustifolia*[5] is perhaps only a semi-cleistogamous form, for in the thousands of plants observed I never saw an expanded corolla The plate, where this form is figured in comparison with *C. exigua*, is somewhat misleading, the unexpanded style of the latter being figured in relation with the fully evolute one of *C. angustifolia*. In the genus the style before maturity is thick, cylindrical or clavate and densely hairy; after expansion of the stigmatic lobes the style appears to shrink to a third of its former thickness, and its hairiness is much less perceptible.

Another plant which may perhaps be a wanderer is *Lithospermum glabrum*.[6] Dr. Gray compares it with the Old World *L. incrassatum* Guss., which I have not seen, but inspection of a

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capillares simplices emittens. Folia alterna, internodiis breviora, 4 lin. longa, 1 lin. lata, omnia (excepta infimis?) florum ex axilla emittunt. Pedunculi fere capillacei, primum flore breviores, 2–2½ lin. longi, demum patuli, capsulam maturam æquantes, fere 4 lin. longi. Calycis tubus *angustus*, 1½ lin. longus, dentes, e triangulari lanceolati, ¾ lin. longi, trinerves in fructu majores. Corolla calycem bis aequans, dorso fissa, quinquepartita, sed non quinquepetala; lobi duo superiores vix breviores, sed paullo angustiores et auctiores, inferiories latiores, lineares, apice rotundati. Filamenta monadelpha; antheræ connatæ paullulum incurvatæ, inferiores duæ setuloso-aristatæ. Stigma crassum, bilobum. Capsula compresso-prismatica, 3½ lin longa, 1 lin. lata, subtruncata, apice fissa, *unilocularis*, polysperma, placentis duabus, parietalibus. Semina oblonga, luteofulva, nitida, sat magna.

Vergleichen wir Endlicher genera p. 510, so weicht unsere Pflanze durch die einblattrige Blumenkrone, die einfacherige, abgestutze, nicht mit der Spitze hervorragende Kapsel von den Capschen Mezlerien ab, so wie durch die Monadelphischen Filamente, und nach dem Prodromus von De Candolle sollen die Mezlerien halbkugelige Kapseln haben. Dennoch glaube ich kaum, dass die angegebenen Verschiedenheiten eine generische Trennung rechtfertigen dürften.—R. A. PHILIPPI, *Bot. Zeitung*. xxii, 217.

(3) Rattan, Bot. Gaz. 11. 339.
(4) Gray, Syn. Fl. ii. pt. i, Supp. 396.
(5) Eastwood, Proc. Cal. Acad. ser. 3. i, 132 pl. xi.
(6) Gray, Proc. Am. Acad. xvi. 227.

fragment, kindly furnished me by Mr. J. G. Lemmon, shows it to be a swollen form of the plant subsequently described as *Allocarya stipitata*.[7] Some misplacement of labels is to be suspected, for the form is common in the Alameda marsh lands, particularly about Mount Eden, and is sometimes even stouter than the one in Mr. Lemmon's herbarium.

2. Although plants are bisexual, one or the other sex is apt to preponderate in varying proportion.

The influence of environment upon plants has been much considered, and seldom quite ignored, but the sexual differences, unless they have progressed so far as complete separation, have been little regarded. These differences are particularly noticeable in incompletely diœcions annuals, and short-lived perennials, where the greater sacrifice demanded of those which are practically female often appears to shorten the internodes, making the plants lower and more stocky and the flowers smaller. Several of the recent species of Sidalcea have no other foundation than these sexual differences. The difference in development of the flowers in different plants of Borraginaceæ Polemoniaceæ, etc., has most probably a similar origin.

3. Hybrids, or rather crosses, are common among closely related species, growing together.

In Europe spontaneous hybrids are numerous and well known, especially in Rubus, Epilobium, Hieracium, Cirsium, etc. In this country they have been systematically studied only among the willows. Our lists of species include, and perhaps unavoidably, many of them, as they can only be certainly distinguished in the field, and the collector seldom takes the trouble, even if he suspects, to verify them. They rarely reach generic rank; I believe, in our Flora, only one, *Crockeria*,[8] which is most probably a hybrid of *Lasthenia* and *Eatonella Congdoni*, has been made out with comparative certainty. Vanclevea[9] is, however, a very suspectable plant. There is in the heads I have examined

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(7) Greene, Pitt. i, 19.
(8) Greene, Bull. Cal. Acad. i, 93.
(9) Greene, Pitt. iv, 50 — but style tips, not "sub-terete."

an unusual variation among the florets, the style-branches are irregular, and the stigmatic lines often irregular or indistinct. If it is a hybrid of course Grindelia is one of the parents. The doubt concerning this plant attaches in some measure to the genus Eastwoodia.[10]

Hybridity appears to be within certain limits a matter more of relative size and texture of the essential organs than of absolute relationship as ordinarily accepted and it will certainly not be necessary to resort to parthenogenesis[11] to account for the seeding of an Antennaria as long as the male of any species of the genus or even of Gnaphalium be present.

The field investigation of hybrids is a most interesting and useful employment for botanists who do not have access to large herbaria and libraries. The life history of a single species, its limit of variation and its hybrids, if any, would be far more useful than a dozen "decades" of new violets or Senecios. A few years ago I happened upon a very instructive object lesson of this kind. In the experiment grounds of Mr. Luther Burbank, the well-known horticultural hybridizer, at Santa Rosa, I observed a row of Zauschneria about a hundred yards in length. Mr. Burbank informed me that he had transferred a single plant from a locality not far away, and saving all the seeds produced by this self-fertilized individual, had planted them to see what variations he could get. In this row were all the forms, both of flower and foliage, which have been observed in the genus, except the extreme narrow or revolute leaf which is climatal variation of drier regions. A few experiments of this kind would rid us of a host of species.

A description of a supposed new organism is imperfect unless every part is fully described. The description by comparison is often worse than none, it involves the assumption that the author is capable of placing a species in the correct genus, or a genus in the proper group, which sometimes can hardly be granted.[12] The

(10) Brandegee, Zoe iv, 397.
(11) Greene, Plant World, i, 102.
(12) Cf. Zoe iv, 63-103 and 287-291.

chief American sinner in this respect is, in fact, somewhat notorious for comparing his new species, not with their nearest, but with their more remote relatives. It may be observed in descriptions by this author, that after a brief description dealing only with the grosser anatomy, the plant in question is compared with one or two others, ending with "species not near akin," "exceedingly well-marked," "not closely related to any other," etc.; indeed, he not only habitually does this kind of work, but defends it[13] as sufficient. In genera the work of this author is even worse, if that be possible, and he has abundantly shown that he is unable to trace an unfamiliar plant to its correct genus, or a genus to its proper group. This may possibly be due to defective methods of investigation, for inability to get at the finer details of structure is only too evident. Such grievous errors as the location of the Zygophyllaceous genus Viscainoa[14] in the vicinity of Simmondsia and of Biolettia[15] near Erigeron ought to have taught him caution, but that it has not is quite evident from the genus Wootonia,[16] which is described as rayless, and of "A quite distinct new type, about equally allied to Bidens and Cosmos, but impossible to be referred to either." The figure of the plant agrees so well with Dr. Gray's *Dicranocarpus parviflorus*[17] as to raise at once a suspicion of their identity; and a specimen, very kindly furnished at my request by Mr. Wooton, shows the suspicion to be well founded. In the only flower examined there were four well-formed but short rays, and four disk flowers. Both under Dicranocarpus and Wootonia the specific name *parviflorus* has been applied on account of this very obvious character. It is not, however, the earliest specific name, the first known description being under Heterospermum,[18] but drawn from very imperfect material. It was collected "between the Guadaloupe

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(13) "One of our beginners in botanical authorship has lately published the complaint that of my *Antennaria media* no description has been given [E. Nelson in Bull. Torr. xxiv, 210]. The complaint is not, I must confess, wholly groundless; although, in giving the essential characters of the species as compared with those of *H. umbrinella* on the one hand, and of *A. alpina* on the other, I fully satisfied the actual requirements of publication, at least as regards the public of experienced phytographers." E. L. Greene, Pitt. iv, 85.

(14) Pitt. i, 163—Embryo very incorrectly described.

(15) Pitt. ii, 215.

(16) Bull. Torr. xxv, 121. Pl. 333.

(17) Plantæ Thurberianæ, 322.

(18) H. dicranocarpum. Pl. Wrightianæ. i, 109.

mountains and the Pecos," in the same general region as Mr. Wooton's plant. Both in Benth. & Hook. Genera Plantarum, and in Engler's Pflanzenfamilien the genus is located among the Melampodiæ.

ASCLEPIAS KOTOLO.

ALICE EASTWOOD.

[This species was published in ZOE, v. 68, without the locality or an explanation of the name. This omission arose because part of the manuscript was misplaced and the proofs were not seen by the author. As it will be confusing and inconvenient to have part of the description in one number of the magazine and part in another, it is here given complete.]

Asclepias Kotolo, Tall and stout about, 1 m. in height, the simple stems hollow and cylindrical, 15 mm. in diameter near the base. Leaves opposite, ternate or rarely quaternate, 10–25 cm. long, 5–8 cm. wide, oblong; cordate truncate or cuneate at base; the apex obtuse, acute or acuminate and mucronate; margins entire or somewhat sinuate; coriaceous, canescent with soft, velvety tomentum, the upper surface of the leaves becoming smoother with age; midrib broad with the chief veins and reticulations noticeable under the tomentum; petioles thick from almost none to about 1 cm. long, 5 mm. broad, with the upper surface concave. Umbels when in flower near the top of the stem but in fruit appearing about the middle, owing to the growth of the upper stem; involucral bracts linear-lanceolate, varying from 5–20 mm. in length. Flowers fragrant, 30 or more in each umbel, on pedicels 2–4 cm. in length, which in fruit become stouter and longer. Sepals and petals reflexed, the former green with the outer surface densely tomentose, the inner glabrous except near the apex, ovate-acuminate to oblong, unequal, 2–3 mm. long. Petals white, tinged with rose-color or with the midrib rose-color, 3 petals broader than the others; the former elliptical, 7 mm. long, 4 mm. broad; the latter oblong, 2–3 mm. broad; apex acute, margin membraneous. Column short; hoods glabrous ven-

tricose with a tooth-like swelling on each side near the base and subtended by a ring which extends to the wings of the anthers; truncate along the top, not open down the back; horn inserted along the entire length of the back with the body protruding in the shape of a camel's back from the opening in the hood and often with a distinct tooth where the hump curves down to the slender acuminate upturned horn which extends above the stigma. Capitate stigma and leaf-like appendages which cover it, greenish white. Abortive ovaries glabrous, fertile ones white-tomentose. Pods erect, pendent or horizontal, on deflexed pedicels which are inclined to be curved at the bend, obliquely ovate-acuminate with the apex curved upwards, about 10 cm. long and 3–4 cm, wide near the base, the broad veins visible beneath the velvety tomentum. Seeds ovate or spatulate, reticulate, the margin narrow.

This is near *A. eriocarpa* Benth. (Pl. Hartw. 325), which was originally collected at Tularcitos, near Monterey. It differs in pubescence, shape of leaves and stems, and especially in the different form of the hoods and horns.

Dr. J. W. Hudson of Ukiah, from whom it was received, suggests that it be given the name by which it is known to the Indians, the Yo-kaí-a tribe of the Pomas. He writes about it as follows: "The Yo-kaí-a call it Ko-to-lo Ka-lí, Kotol meaning twice or double-leaved while Kalí is the general name for plant. The Ca-nél tribe name it Du-wi-cím-ma which means night-ear. It grows on poor soil, usually on hillsides. The stalks are shredded and manufactured into twine, rope, etc. The fiber is soft and fine but of medium strength." Dr. Hudson collected the specimens from which the description was drawn, along the Russian river, near Ukiah, in both flower and fruit, in the later part of August, of last year.

The species is represented in the Herbarium of the California Academy of Sciences by the above type, by a specimen collected on Cobb mountain by C. F. Leithold, and by one from near Bartlett Springs, donated by Mrs. Alexander McCallum.

A STUDY OF ERYSIMUM GRANDIFLORUM NUTT. AND THE SPECIES AGGREGATED UNDER IT.

ALICE EASTWOOD.

This species as described in the Synoptical Flora, Vol. I, pt. 1 p. 144, is an aggregate representing either several species or subspecies. The attention of the writer has been called to the matter by the rediscovery of the type on "Sand hills of Point Pinos, in the vicinity of Monterey." This differs so much from the form included under the same name found near San Francisco and from a species collected at Mendocino by H. E. Brown, and distributed as No. 708 of his collection, that the writer has felt it necessary to segregate these different species from the type form.

Nuttall's description of the type is so full and fits the specimens at hand so perfectly that it seems advisable to repeat it here.

E. grandiflorum (Nutt. ! mss.): "dwarfish, slightly roughened with appressed, forked or stellate hairs; leaves oblong-spatulate, obtuse, entire or somewhat angularly lobed towards the base; petioles long and slender; flowers in capitate corymbs; siliques very long, somewhat torulose; stigma conspicuously 2-lobed.

"Sand hills of Point Pinos, in the vicinity of Monterey, Upper California, March.—Root very long and straight, perennial. Stems growing partly under the sand, crowned with the vestiges of several years' growth of leaves; the part above ground 3 to 6 inches in height. Leaves very flat, often wholly entire, sometimes repandly denticulate, sometimes angularly lobed below; lamina an inch or more in length and 5–6 lines broad, attenuated at the base into a slender petiole 1–2 inches long. Corymb scarcely extending beyond the leaves. Flowers fragrant, deep yellow, uncommonly large. Inner sepals saccate at the base. Petals with the claws exserted. Filaments very broad, flat. Siliques 2–3 inches long, somewhat curved upwards and outwards, scarcely a line wide. Style scarcely any; stigma pubescent." Nutt. (Torr. & Gray, Fl. N. Am. I. 96.)

Nuttall's specimens were collected earlier in the season than those of the writer, which were collected April 15, 1900,

In these specimens the ripe siliques are 7 cm. long and about 3 mm. broad, and spread either horizontally or upwardly. The stems are generally several from a perennial root and are conspicuously clothed with the sheathing petioles of former leaves for about two inches below the ground. The new shoots for the flowering stems of the next year are almost always present and have spatulate leaves with small blades, about 1 cm. long, and almost filiform petioles 2–5 cm. long. The flowers are 2 cm. or more across. The seeds are 1–6 mm. in diameter, narrowly winged but not continuously, and have accumbent cotyledons. The short style of the silique is evident and forms a beak.

The form common in the vicinity of San Francisco was originally described in Linnæa I. 14, by Chamisso and Schlechtendal. The transcript of the original description follows:

"Cheiranthus *asper*. Nob.

Ch. foliis sinuato-dentatis, inferioribus lanceolatis, superioribus sublinearibus, pube bipartita, caulibus basi adscendentibus erectis, siliquis pedicello triplo longioribus stylo brevi apiculatis." * * * "In littore Californiæ."

"Habitus florentis plantæ est species omnis Erysimi lanceolati cujus varietatum esse crederes. Tota planta paullo magis scabra, folia radicalia et caulina remote sinuato-dentata, dentibus acutis. Caulis sesquipedalis basi adscendens, simplex aut ramosus, fere semper atque ex omnibus axillis foliorum fasciculos s. ramos abbreviatos steriles prodens. Pedunculi quam in Er. lanceolato paullo longiores circiter 6 lineares. Siliquæ paucæ maturæ in nostris speciminibus, circiter 15 lin. longæ, lineam latæ, compressæ; plurimis ovulis abortu haud perfectis, pauca modo aderant semina in quoque loculo; valvulæ medio nervo extus prominente a basi ad apicem sunt notatæ. Stylus siliquam terminans brevis vix semilinearis, crassus, stigmate capitato, indistincte bilobo. Semen lineam longum compressum, cotyledones accumbentes."

This species was identified by Hooker from specimens sent to him by Chamisso with a species collected by Douglas "on rocky places of the Columbia, near the sea and at Puget Sound," Hook. Fl. Bor. Am. I. p. 38.

The original description of Douglas with fuller notes by Hooker here follow :

"*C. capitatus*; subasper, foliis lineari-lanceolatis magis minusve dentatis vel integris basi longe attenuatis cauleque pube bipartita arctissime appressa strigosis, floribus (majusculis) dense corymbosis, siliquis pedicello triplo longioribus."—*Douglas MSS.*

"*Radix*, ut videtur, annuus. *Caulis* basi ascendens et ramosus, demum erectus, pedalis et ultra, acute angulatus, tactu subscaber, pube bipartita subcanescens. *Folia* remotiuscula, 3–5 pollicaria, patentia, lineari-lanceolata, majis minusve dentata vel integerrima, basi in petiolum longe attenuata, pube bipartita, arctissime appressa, strigosa: *suprema* majis angusta *minus* basi attenuata. *Flores* majusculi, in capitulum duas uncias latum dense racemosi, flavi. *Pedicelli* 5–6 lineas longi, appresse pilosi. *Calyx* etiam simili modo pilosus, sepalis linearibus, 2 basi saccatis. *Petala* limbo ovato, ungue sepalis longiore. *Germen* lineare, rectum. *Stylus* crassiusculus, lineam longus. *Stigma* mediocre, capitatum, bilobum, lobis rotundatis. *Siliquae* nostris exemplaribus absunt: sed, *Chamissonis* fide." Here follows a quotation from the description of Chamisso given above.

Professor Greene renames this species, *Erysimum capitatum* Fl. Francis. p. 269, and redescribes it under that name. According to the experience of the writer the flowers are decidely fragrant, a bunch of them filling a room with the odor of the "wall flower;" the flowers are a bright canary yellow when they first expand changing to a creamy yellow after pollination. The earlier flowers are much larger than those that are in bloom when the pods are present and the early inflorescence is truly capitate.

"*Erysimum Californicum* Greene Eryth III. 69, Biennial, stout and simple, or with few branches, 1–2 ½ feet high: herbage scarcely canescent, but thinly covered with closely appressed divided hairs, the divisions of which are stout and subulate: Leaves runcinate-toothed, or the upper cauline mostly entire: raceme rather dense: Flowers large, yellow, fading to cream-color, very fragrant, sepals more than ½ inch long, the inner with saccate base, the outer longer, unguiculate: limb of corolla 1¼ inches long, only ¾ inch broad, not cruciform, the petals diverging in pairs: anthers slenderly sagittate, the 4 longer

ones exserted: pods long, slender, almost spreading, the cross-section sharply rhombic."

A large plant of the Mt. Diablo Range, California, growing only on open grassy summits: the pale flowers large and delightfully fragrant."

The writer has never seen this species but it probably belongs to the aggregate and ought to be included.

Erysimum concinnum n. sp. Apparently biennial, stem stout, simple, erect, 15 cm. high. Pubescence simple and bifid, upwardly appressed. Radical and lower cauline leaves spatulate to oblanceolate, tapering to broad margined petioles as long as the blades, altogether about 5 cm. long: margin runcinate-dentate with mucronate teeth, blades 5-10 mm. wide: upper leaves lanceolate or oblong, sessile or on very short petioles. Flowers large, 3 cm. or more in diameter, canary yellow, crowded in a capitate corymb, fragrant even when dry; pedicels stout, ribbed, 10–12 mm. long. Sepals pubescent externally, 15 mm. long: the two outer slightly narrower than the inner, 3 mm. wide, thickened and hooded at apex: the two inner saccate at base, carinate, membranous at apex. Petals with orbicular blades 10-15 mm. in diameter, sparingly pubescent externally, tapering to an exserted claw 15–18 mm. long. Stamens with sagittate anthers, 5 mm. long, exserted from the throat of the corolla, with filaments broadening towards the base, the 2 short ones narrower than the others which are 2 cm. long and 1 mm. wide. Pistil as long as the longer filaments, surmounted by a broad, shallowly-lobed, sessile stigma. Immature pods, flattened, nerved, becoming spatulate at the apex below the stigma, 8 or 9 cm. long; the upper ones erect-spreading, the lower falcately recurved-spreading. Collected by H. E. Brown (No. 708), near Mendocino, Mendocino County, California, June, 1898.

Under this species are also included specimens collected by the writer at Bodega Point April 1899 and again June of the same year. The last have ripe fruit from which the following description is drawn. Siliques 2–5 mm. broad, the longest 15 cm. long, with sessile 2-lobed, stigmas, valves keeled; pedicels stout, 1–2 cm. long. Seeds 3 mm. in diameter with a wing almost .5 m. broad, completely encircling the seed; cotyledons accumbent.

NEW SPECIES OF PLANTS, MAINLY FROM BAJA CALIFORNIA.

T. S. BRANDEGEE.

Ranunculus australis. *R. abortivus australis*, Brandegee, Zoe, iv, 399. Perennial, glabrous, 2–3 dm. high: radical leaves on petioles two-thirds as long as the stems, 3–4 cm. wide, round-reniform, simply or doubly dentate; cauline once or twice parted into linear divisions: petals bright yellow, 5–6 mm. long: akenes lenticular, glabrous, 1½ mm. long, beakless, in small globular heads.

From *R. abortivus* it differs, especially in having long-petioled basal leaves of a different outline. It is common about the higher summits of the Cape Region Mountains.

Malpighia diversifolia. A spreading bush 1–2 m. high, young stems slightly pubescent, dark brown: mature leaves 4 cm. long and wide, orbicular to broadly ovate, on pubescent petioles 2 mm. long, rounded or the ovate ones bluntly pointed, hirsute below and nearly glabrous above; younger leaves more hirsute upon both faces, especially so upon the lower; stipules minute, hirsute: umbels 2–4 flowered; peduncles hirsute, 1–3 cm. long, the pedicles 1 cm. long, jointed nearer the base; bracts and bracteolæ minute; calyx lobes ovate-lanceolate, acute, hirsute: petals rose-colored, 7 mm. long, more than twice the length of the calyx, deeply fringed-laciniate, with a claw 3 mm. long, and an orbicular blade 6 mm. wide: stamens united at base ⅓ their length; sepals with two large glands at base excepting one which has a gland on each side, at the sinus: fruit depressed, 15 mm. wide.

Common about San José del Cabo. The fruit is called by the people manzanita, and without any special reason is sometimes eaten by them. In the Flora of the Cape Region it is listed as *M. Gallcotiana*? to which species and *M. retusa*, by their characters, it seems to be nearest.

Rarely some of the leaves are retuse or may be somewhat lobed near the apex.

Brongniartia trifoliata. A spreading bush 2–4 m. high, the younger growth tomentose : leaves trifoliate, 6–10 cm. long, the terminal leaflet sometimes twice as large as the others ; petioles and petiolules white-tomentose ; leaflets coriaceous, glabrous, oblong, cuneate or cordate at base, obtuse or retuse, 2–3 cm. long, 1–2 cm. wide, somewhat repand ; petiolules 2–3 mm. long ; stipules deciduous : pod 1–2 seeded, 3–3½ cm. long, 1½–2 cm. wide, glabrous, narrowly margined, tipped with an awn 3 mm. long ; stipe 3 mm. long : flowers not seen.

This bush is common at middle elevations of the Cape Region Mountains. It seems to be a very distinct species, and in the absence of flowers its generic position is indicated by the stipe of the pod, and the strophiolate seeds having a very short, straight radicle. The leaves resemble slightly those of *B. inconstans* but lack the stipules, are ochroleucous in color, thicker in texture and veins not as prominent. From the characters, it seems to be nearer *B. Parryi* than any other described species.

Houstonia prostrata. A prostrate annual ; stems spreading 1–2 dm. long, hirtellous : leaves oblanceolate, 1 cm. long, hirsute, especially the under side, margins revolute ; stipules scarious, laciniate-dentate : flowers axillary near the ends of the branchlets on pedicels 1 mm. long or less : calyx 1½ mm long including the ovary ; lobes more than half as long, acute : corolla light purple, 1½ mm. long, lobes very short : capsule depressed-globose, subdidymous, three fourths inferior : seeds oblong, cymbiform, the margins more or less involute, with a median hilar ridge.

This plant must be nearest *H. parviflora*. Growing flat upon the clean sand of a dry stream it had the appearance of a prostrate Euphorbia. Collected near La Palma, in the Cape Region.

Perezia pinetorum. Herbaceous, branching, 1 m. high, puberulent, glandular above : branches spreading, leafy : the inflorescence cymose-paniculate . leaves chartaceous, oblong, acuminate, spinulose-dentate, the lower ones 2 dm. long, 1 dm. wide, the large auricles nearly clasping the stem ; veins strongly reticulated : heads on pedicles 2–3 cm. long, 15–20 flowered : scales of the involucre linear-lanceolate, long-acuminate, the

inner ones 15 mm. long, puberulent: akenes glandular-puberulent.

This plant is very near *P. oxylepis*, but the larger heads are arranged in a more cymose inflorescence and the conspicuously reticulated leaves have larger dentations. The form of inflorescence gives to the species a very different appearance.

BUMELIA OCCIDENTALIS, Hemsley, Biol., Cent.-Amer. ii, 298. Specimens of a bush that agree very closely with the description of this species were collected at San José de Gracia, near the central latitude of the peninsula. Though generally unarmed as described, some of the specimens bear small spines. What seems to be the same thing was collected at Pescadero, near Todos Santos, where it formed small trees. I also collected apparently the same plant in fruit at Durasnillas, fifty miles from Hermosillo, Sonora. The type came from "North Mexico, Sonora Alta."

Bumelia Socorrensis. Glabrous excepting the young growth, peduncles, pedicels and calyx lobes, which are sparingly pubescent: leaves not fascicled, obovate, cuneate at base, 4–5 cm. long, 1–2 cm. wide, attenuate into a petiole 5 mm. long; flowers in small fascicles in the axils of the leaves on pedicels 3–4 mm. long: calyx coriaceous: appendages shorter than the corolla lobes, lanceolate, fimbriate, narrower and shorter than the ovate-lanceolate staminodia that in old flowers are acuminate and somewhat fimbriate: fruit elliptical, 12–14 mm. long, 8 mm. wide.

The specimens are all unarmed excepting one which bears a few sharp axillary spines, 1 cm. long. The leaves resemble those of *B. lanuginosa*, but do not have its pubescence.

Collected upon Socorro Island by Mr. A. W. Anthony.

Bumelia fragrans. A shrub 3–5 m. high, glabrous, excepting the pubescent pedicels and calyx segments, the short branches spinescent; leaves coriaceous, in fascicles of about 4, obovate, obtuse, cuneate at base into a very short petiole: flowers in fascicles of 10–20 on pedicels 7–10 mm. long, white: calyx segments coriaceous with hyaline margins: corolla 5 mm. long, exceeding the calyx; appendages interior, nearly 1 mm. broad, oblong, obtuse, fimbriate, little shorter than the lobes: staminodia narrowly ovate, broader and longer than the appendages to

the corolla lobes, fimbriate: anthers sagittate-acuminate: filaments hardly widened at the base: ovary hirsute; fruit unknown.

Collected near San José del Cabo, where it grows amongst Rhamnaceous shrubs, and when in full bloom in May, its fragrance fills the air. It is characterized by the slender stems and short thorn-like branches that bear leaves and sometimes flowers, and its closely aggregated usually leafless fascicles of flowers. It much resembles *B. spiniflora*, Calques des Dess. Fl, Mex., 753, differing in the more crowded fascicles of flowers, their longer pubescent pedicels and other minor details.

Bumelia peninsularis. A bush 3–4 m. high, much branched from the base, with stout subulate axillary thorns, the young shoots, petioles and under surface of leaves rusty-pubescent: leaves thin-coriaceous, elliptical or obovate-lanceolate, 2–4 cm. long, tapering to a slender petiole 4–6 mm. long: peduncles subglabrous, stout, clavate, as long or longer than the flower; calyx segments ovate; corolla lobes, 3 mm. long, equalling the inner segments of the calyx; appendages and stout staminodia more or less fimbriate, acuminate, equalling the stamens; filaments shorter than the anthers; ovary glabrous: fruit 15 mm. long, elliptical, fleshy.

Found in the Cape Region Mountains. The flowers are small for the genus, usually in fascicles of 4–6 in the axils of the leaves but sometimes apparently scattered along the branches. The leaves are venulose-reticulated and not fascicled. The fruit is large when compared with that of other species of the genus.

Gilia uncialis. Annual, sparingly pubescent, 2–4 cm. high, stems usually simple, rarely 1–2 branches near the base: leaves narrow-linear, 3–4 mm. long: flower white, terminating the stem, often with 1–2 additional ones from the axils of the upper leaves, on pedicels 5 mm. long: corolla funnelform, 4–6 mm. long; lobes denticulated, slightly exceeding the linear calyx lobes: ovules about 10 in each cell.

This Gilia is closely allied to *G. dianthoides*, and its most obvious difference is a small corolla, but there is no resemblanc to

the depauperate form common about San Diego in "dry seasons," described by Nuttall under the name of *Fenzlia concinna*.

Collected on Cedros Island, 1897, and growing in abundance near the summit of the highest mountain, on the sides of gulches and under the shade of bushes.

Salvia peninsularis. Herbaceous and probably perennial, 1 m. high, branching below: stems slightly pubescent: leaves ovate-lanceolate, acuminate, sharply serrate, cordate to somewhat cuneate at base, white-tomentose beneath, pilose and greener above, the larger 12 cm. long, 5 cm. wide, on petioles 2–2½ cm. long: racemes 15 cm. long, bracts not seen: verticels 1–2 cm. apart, 4–6 flowered; pedicels 5 mm. long and less, white-pubescent: calyx pubescent, especially upon the nerves, 7 mm. long; lobes short, the upper blunt, shorter than the two deltoid lower ones: corolla 3 cm. long or less, brick red, its tube three times as long as the calyx, ventricose at the throat, the pubescent galea longer than the lip, style bearded.

In Mr. Fernald's Synopsis of American Salvias, this species would seem to belong near *S. Martensii*. Collected at San Pablo, Central Lower California, Apr. 22, 1889, and by Dr. C. A. Purpus near the same locality in 1898.

Salvia similis. A much branched shrub, forming rounded clumps 1 m. high or more, young growth white with a close pubescence: leaves ovate-acuminate, cuneate at base, serrate or crenate-serrate, minutely white-stellate especially on the nerves, the larger ones 4–5 cm. long and 2 cm. wide, on petioles more or less white with a close indumentum, 3 cm. long and less: racemes short, 3 cm.long and less; flowers crowded; bracts linear-lanceolate, 1 cm.long: calyx 5 mm. long on a pedicel 1 mm. long, tomentulose, striate, half the length of the light blue corolla: style bearded.

This species resembles *S. Cedrosensis* and has been distributed under that name. It is a larger shrub with thinner, greener and more acuminate leaves that are often serrate. The short flowering racemes are borne at the ends of the spreading branches, while those of *S. Cedrosensis* terminate upright white shoots, half a foot or more high. It grows among the Cape Region Mountains.

Ruellia leucantha. A shrub forming rounded clumps about 8 dm. high: stems pubescent, obtusely 4-angled: leaves opposite, ovate, acuminate, 5–6 cm. long, 2–4 cm. wide, pubescent, margins ciliate and entire or sub-repand, narrowed at base into a petiole: flowers solitary, sessile in the axils of the leaves, crowded about the ends of the branches: bracts narrowly oblanceolate, 15 mm. long: calyx 5-parted, tube 2 mm. long, lobes 1½–2 cm. long, linear-attenuate, pubescent: corolla white, 6 cm. long, externally puberulent; tube gradually ampliated into the obconical throat; lobes rounded, 1½ cm. broad: capsules pyriform, acuminate, 15 mm. long, 8–10 ovuled; seed nearly circular, 4–5 mm. wide, pubescent.

Common along the slopes of the Cape Region Mountains. Flowers can be found at any time of the year.

ERRORS IN THE REPORTED STATIONS OF SOME SOUTHERN CALIFORNIA PLANTS.

S. S. PARISH.

The student of local botany can address himself to no more useful task than that of ascertaining, with accuracy, what are the plants which inhabit his region, and to which of its several divisions each pertains. It this way he comes to understand correctly, and to be able to define, its life-areas, their subdivisions and their interrelations; and while thus gaining a true knowledge of his limited district, he, perhaps, may supply some factors for the solution of the wider problems of phytogeography.

Thus studied each plant, and each group of plants, presents its own question. What are the influences which limit each within narrower or wider boundaries? A question readily answered in some cases; in many difficult and obscure; but in all demanding first a correct knowledge of what those boundaries are. When, then, a plant supposed to be confined to a certain life-area, or which by reason of its affinities is presumedly so confined, is reported from another—a desert species from the

mountains, for example—perplexity arises, and even incredulity, and it becomes of importance to make sure that no mistake has been made.

To correct some ascertained errors of this kind, and to call attention to other probable ones, is the chief object of the present paper. Besides this it seems desirable to rectify some mistakes which have been made in recording the type-stations of certain species, and to eliminate from the southern Californian flora some species which have been accredited erroneously to it.

Errors such as these arise from several causes. Some occur from a pardonable ignorance of local geography, a misapprehension which led Brewer and Watson to include in the Californian flora a number of plants from Ft. Mojave, a station which is really in Arizona. Sometimes plants have been supposed by the botanists who received them to have grown at the collector's residence, or at the place whence he forwarded them, and in this way several of Dr. Parry's type-specimens have been located incorrectly. Other errors originate in mistaken identifications, which once finding their way into print are too apt to be repeated by subsequent writers. Less excusable are the blunders due to the negligence of collectors in supplying proper data with their specimens, or the carelessness of authors in noting the labels of herbarium sheets.

ASPIDIUM ACULEATUM PROLIFERUM Wolleston.

Dr. Eaton[1] notes this fern as "very abundant in the southern part of the state, and commonly called the 'San Diego fern,'" but I do not find that any of our resident botanists are aware of its presence, or have heard the supposed trival name. The only variety of this species which is known from southern California is the var. *scopulinum*, collected at a single station in the San Bernardino mountains.

BROMUS DEPAUPERATUS Presl, Rel. Hænk. 1: 263.

To this species Dr. Beal refers specimens said to have been collected at San Diego by Bolander, and by Kellogg;[2] but Mr. Shear,

1 Eaton, D. C., Bull. Torr. Club, 8:4.

2 Beal, W. J. Grasses, N. Am., 2: 613.

in his recent monograph, relegates it to the doubtful list.[3] And, indeed, it is scarcely credible that anative of Nootka Sound should reappear in this southern latitude, and it seems more probable that an error has occured, either as to locality, or in identification. As to the Kellogg specimen I am able to state, on the authority of Mr. Harford, his long-time botanical associate, that Dr. Kellogg never made any collections in the San Diego region. Dr. Bolander, however, did visit San Diego County, and, in the spring of 1873, collected at San Diego, Cuyamaca, Julian and elsewhere.[4] But geographical and climatic reasons make it most unlikely that this grass was among his finds. I have been unable to ascertain where the specimens named by Dr. Beal are preserved.

HILARIA MUTICA Benth. Jour. Linn. Soc. 19: 62.

The reported presence of this grass in southern California[5] is due to an error in the labels on a sheet of specimens in the National Herbarium. The plants really came from Texas. The specimens collected in the Coso Mts. of Inyo County by the Death Valley Expedition, and refered in the report to *H. mutica*,[6] belong to *H. Jamesii* Benth.[7]

PASPALUM PUBIFLORUM Rupr. Bull. Soc. Brux. 92: 237.

This was reported from southern California by Dr. Vasey[8] by an oversight, Lower California being intended.[9]

ARISTIDA ORCUTTIANA Vasey, Bull. Torr. Club, 15: 37.

In this case also southern California[10] is an error for Lower California. Mr. Orcutt's specimens are from Hanson's Ranch, not far beyond the California boundary. The grass, perhaps, may extend into the state, but is not known to do so.

PAPPOPHORUM WRIGHTII Watson, Proc. Am. Acad. 18:178.

This Mexican grass is credited to "Los Angeles, Cal.," by Dr. Beal[11] on 511 *Palmer* of 1887. Dr. Palmer's specimens were

3 Shear, W. C., Bull. U. S. Div. Agrost., 23:63.
4 Jepson, W. L. Eryth., 6:103.
5 Scribner, F. L. Am. Grasses, 3d ed. 1: 25
6 Coville; F. V. Death Val. Rep. 215.
7 Scribner, F. L. in lit.
8 Vasey, G. Grasses S. W. 25.
9 Vasey, G. in lit.
10 Beal, W. J. l. c. 2: 210.
11 Beal, W. J., l. c., 2: 448.

collected at Los Angeles Bay, on the gulf coast of Lower California.

MUHLENBERGIA GRACILIS Trin. Unif. 193.

By a confusion of names this grass was included in Mr. Brandegee's list of Santa Catalina plants,[12] *M. debilis* Trin. (*M. microsperma* Trin.) being intended. *M. gracilis* is not known from the southern part of the state.

ORCUTTIA CALIFORNICA Vasey, Bull. Torr. Club, 13: 219.

This species has been reported as extending into California,[13] but I cannot find that there are any specimens from the American side of the boundary. All those in the National Herbarium are from Lower California.

SISYRINCHIUM CALIFORNICUM Ait. f. Hort. Kew. Ed. 2, 4: 135.

S. lineatum Torr. is a synonym of this species, and in his note on it, Dr. Torrey states that it was "first detected by Dr. Parry, who found it near San Diego."[14] The type, however, is a specimen collected by Dr. Parry, in April, 1850, in Monterey County, which is still preserved in the herbarium of Columbia University.[15] No representative of his San Diego plant is known to be in existence, nor have subsequent collectors met with the species so far south. There are numerous errors in the reported stations of Dr. Parry's plants, and that of San Diego for this one is probably to be included among them. Monterey County may be regarded as the authentic southern limit, so far as our present information goes.

URTICA BREWERI Watson, Proc. Am. Acad. 10: 348.

Los Angeles is the type-station of this species, and the type is 95 *Brewer*, in the Gray herbarium. On the label is the note: "Everywhere in waste places about Los Angeles." In recent years Los Angeles has been the residence of several zealous botanists who have diligently sought to rediscover Brewer's plant, but without success. It is probable, therefore, that Brewer was in error as to its supposed abundance, having mistaken, perhaps, the common *U. holosericea* Nutt. for it. Whether his type really came from Los Angeles is also open to doubt. The

12 Brandegee, T. S. Zoe, 1: 115.
13 Scribner, F. L. Am. Grasses, 3d ed., 1: 234.
14 Torrey, J. Pac. R. Rep. 4: 13.
15 Bicknell, E. P. Bull. Torr. Club, 27: 376.

nearest subsequent collection is that made at the Mt. Whitney Meadows, by Coville & Funston.[16] The plant appears to belong to higher altitudes than that of Los Angeles.

CHORIZANTHE SPINOSA Watson, Bot. Cal. 2:481.

The type-specimen is noted as collected "near San Bernardino, by *Lemmon*." It really came from the Mojave Desert, where it has been obtained since by several botanists.

ATRIPLEX PARRYI Watson, Proc. Am. Acad. 17:378.

A specimen said to have been collected by Dr. Parry "near Colton" is the type of this species. Dr. Parry's plant was colletecd at Lancaster, in the Mojave Desert.

KOCHIA CALIFORNICA Watson, Proc. Am. Acad. 17:378.

One of the types of this species, also, is noted as collected "near Colton, by Parry," but like the last came really from Lancaster. Both plants are characteristic desert species, and are not rare in the Mojave Desert.

CLADOTHRIX CRYPTANTHA Watson, Proc. Am. Acad. 26:125.

Dr. Parry's 274 of 1881, a part of the type of this species, is another distinctively desert plant erroneously stated to have been collected "at Colton." Dr. Parry obtained it in the eastern part of the Colorado Desert.

LUPINUS MICROCARPUS Sims, Bot. Mag. t. 2413.

There is a specimen of this plant in the Gray herbarium, labeled "? *Thurber*, San Diego," which appears to be the principal evidence of its existence in southern California. Certainly it is not "frequent," as noted by Brewer and Watson in the Botany of California.

DALEA CALIFORNICA Watson, Proc. Am. Acad. 11:132.

The original description of this species cites as the type "scanty specimens recently collected by Dr. Parry in the San Bernardino Mountains," and in the Botany of California[17] the locality is given more definitely as "dry washes in the San Bernardino Mountains, near Cajon Pass." In reality Dr. Parry's type was collected on the borders of the Colorado Desert, a few miles east of Banning. The plant, an intricately branched

16 Coville, F. V. Death Val. Rep. 195.
17 Brewer & Watson, Bot. Cal., 1:143.

shrub, 2–6 ft. high, is frequent in dry washes of the desert along the eastern base of the San Bernardino Mountains, from the true type station to Byrne's Spring, at 1,000–4,000 ft. alt. It does not grow in or near Cajon Pass.

ASTRAGALUS COULTERI Benth. Pl. Hartw. 307.

Parry and Lemmon's reported station for this plant, "on the Mojave River" is an error. Their specimens came from the sand-drifts about Whitewater Station, on the Colorado Desert, where the plant is abundant. It appears not to reach the higher altitude of the Mojave Desert.

TRIBULUS MAXIMUS Linn. Sp. Pl. 386.

The basis on which this species has been included in the Californian flora appears to be Dr. Torrey's note: "New River Region, Parry."[19] If this was founded on more than a field-note of Parry's, the specimen probably has perished. There are no Californian specimens in either the Gray, Torrey, or National herbaria. Yet both this species and *T. grandiflorus* Benth. & Hook. may be expected confidently from the region indicated by Dr. Torrey.

BERNARDIA MYRICÆFOLIA Watson, Bot. Cal. 2:70.

This is a plant of the lower altitudes of the deserts. It certainly does not reach the "headwaters of the Mojave River," where Dr. Watson reports Parry and Lemmon as collecting it. They probably got it at Whitewater or Palm Springs, in the Colorado Desert. It may occur on the lower part of the Mojave River, but they made, I think, no collections so far down.

EUPHORBIA SETILOBA Engelm.: Torr. Pac. R. Rep. 5:364.

Dr. Watson gives "San Bernardino, Parry," as a station for this plant.[20] This is an error; Dr. Parry probably got this strictly desert Euphorbia in its type neighborhood, Ft. Yuma, where it has been collected by several other botanists.

CEREUS GIGANTEUS Engelm. Emory's Rep. 159.

This species was inserted in the "Additions and Corrections" at the end of the second volume of the Botany of California, but,

18 Watson, S. Bot. Cal. 2:441.
19 Torrey, J. Bot. Mex. Bound, 22:42.
20 Watson, S. Bot. Cal. 2:73.

apparently, without any authority. Dr. Coulter includes it in the State flora on "149 *Wright.*"[21] This specimen is in the Gray herbarium, and, as the label shows, was collected in 1880 by Mr. W. G. Wright, in "Arizona."[22] It is almost certain that this species does not cross the Colorado River.

OPUNTIA RUTILA Nutt.; Torr. & Gray, Fl. 1:555.

The only southern California report for this opuntia is based on a collection by Bigelow, in 1853-4. It was made "west of the great Colorado, near the Mojave Creek,"[23] and became the type of *O. erinacea* Engelm. & Bigel., a species subsequently recognized as identical with Nuttall's earlier *O. rutila.*[24] The nearest collections since Bigelow's time are those of Coville and Funston, in the Panamint and White Mts.,[25] but the species may be expected with confidence from the Providence Mts., when these come to be explored thoroughly.

OPUNTIA DAVISII Engelm. & Bigel.; Engelm. Proc. Am. Acad. 3:305.

This is reported from California by Dr. Coulter on a specimen by "Parish, of 1880."[26] It is not in the Engelmann herbarium, to which all my earlier collections of Cactaceae were sent, nor can I find other trace of it. It must have been from the eastern part of the Colorado Desert; unless a form of *O. echinocarpa* has been mistaken for the present species.

OPUNTIA WHIPPLEI, Engelm. & Bigel.; Engelm. Proc. Am. Acad. 3:307.

Dr. Coulter reports this opuntia as collected by Agassiz, at San Diego.[27] It certainly does not grow near San Diego, and if it grows anywhere in the state, which it is not known to do, it probably would be on the eastern borders of the Colorado Desert.

OPUNTIA ACANTHOCARPA Engelm. & Bigel. Pac. R. Rep. 4.51.

This species is added to the California Flora by Dr. Coulter[28] on 1493 *Coville & Funston.* But this number was collected at

21 Coulter, J. M. Contrib. U. S. Herb. 2:407.
22 Fernald, M. L. in lit.
23 Engelmann & Bigelow, Pac. R. Rep. 4:44.
24 Engelmann, G. Simpson's Rep. 442.
25 Coville, F. V. Death Val. Rep. 114, &c.
26 Coulter, J. M. l. c. 445.
27 Coulter. J. M. l. c. 450.
28 Coulter. J. M. l. c. 454.

Beaver Dam, Utah, and all the collection of this cactus made by the Death Valley expedition were in Utah or Nevada. [29]

ERYTHRÆA TRICHANTHA Griseb. Gent. 146.

Schumacher is reporte d to have collected this plant on Santa Catalina Island,[30] but subsequent collectors there have not found it. There is no specimen from Schumacher, or any Santa Catalina specimen, in the Gray herbarium, and the authenticated range of the plant does not indicate its presence on the island.

ERYTHRÆA FLORIBUNDA Benth. Pl. Hartw. 322.

This has been reported from the mountains of San Diego County, by Mr. Orcutt;[31] but a specimen of his, so labeled, is *E. Douglasii* Gray.

CONVOLVULUS CALIFORNICUS Choisy in DC. Prodr. 9.405.

This plant is mentioned in Mr. Lyon's paper on Santa Catalina,[32] but there appear to be no specimens in existence from him, and others have not found it on the island. Mr. Lyon's plant may have been a form of *C. occidentalis* Gray.

GILIA DEMISSA Gray, Proc. Am. Acad. 8: 263.

The type-region of this species is "S. E. California, and adjacent parts of Arizona." In the Botany of California the supposed California station is "Ft. Mojave, Dr. Cooper."[33] While I am unable to find any evidence of the actual collection of specimens in the state, I have no doubt that it yet will be found in the north-eastern part of San Bernardino County.

LEMMONIA CALIFORNICA Gray, Proc. Am. Acad. 12: 162.

Mr. Lemmon's type is reported to have been collected at "Bear Valley Creek, on the headwaters of the Mojave River." Bear Creek, which drains the valley of the same name, is a tributary of the Santa Ana River, on the intramontane slope of the mountains, and *Lemmonia* is not found on it. This is a desert plant, and grows, in dry open soil, along the desert base of the San Bernardino Mts. from Cajon Pass to Cox's Ranch, at altitudes between 3,000 and 4,000 feet. And here the Lemmon collection, no doubt, was made.

29 Coville, F. V. l. c. 112, 277.
30 Watson, S. Bot. Cal. 2:464.
31 Orcutt, C. R. Fl. S. & L. Cal. 7.
32 Lyon, W. S. Bot. Gag. 31:31.4
33 Gray, A. in Brew. & Wats. Bot. Cal. 1: 489.

AMSINCKIA LYCOPSOIDES Lehm.; DC. Prodr. 10: 117, and A. TESSELLATA Gray, Proc. Am. Acad. 10: 54.

Both these species are included in Mr. Brandegee's Santa Catalina list;[34] but the specimens, which he has kindly sent me, seem to be *A. spectabilis* F. & M., the only species I have seen, as yet, from southern California.

MONARDELLA HYPOLEUCA Gray, Syn. Fl. II. 1: 356.

The type-locality is given as "S. E. California, San Bernardino Co., *Parry & Lemmon.*" The label of the type-specimen, in the Gray herbarium, does not show where it was collected, but the locality quoted above is certainly an error. The plant is a coast species, and has been collected at San Diego, by Orcutt, and at San Juan Hot Springs, by Nevin.

PHYSALIS MURICULATA Greene, Bull. Cal. Acad. 1: 209.

The type of this species came from San Quintin, in Lower California, and Dr. Rydberg identifies with it a specimen from "River Side, Parry, 1882."[35] There is, I am informed, a Riverside Mt. on the Colorado River, below Yuma, and on the California side of it, and from this region one reasonably might suppose Dr. Parry's plant would come. It is certain, however, that he did not visit this mountain in his later years. I am inclined to believe the specimen to be one which he collected in the spring of 1882, on the northern extremity of the arid range of hills which separate Rèche Cañon from the plain on which the well-known town of Riverside is situated. The writer has sought to rediscover it here, but without success. Dr. Parry was unable, at the time, to identify this plant with any then described species. In view of the conditions which determine the distribution of the southern California flora, it is highly improbable that a peninsular species should re-appear at the place above indicated, and as Dr. Parry's plant differs, according to Dr. Rydberg, in some points from Dr. Greene's type, it is perhaps not properly referable to it.

PHYSALIS WRIGHTII Gray, Proc. Am. Acad. 10: 63.

Dr. Rydberg gives this from California on specimens collected by Buckminster, and two of Lemmon's, No. 294, and No. 10 of

34 Brandegee, T. S. Zoe, 1:114.
35 Rydberg, P. A. Mem. Torr. Club, 4: 353.

1880.[36] But Buckminster's specimens were collected in the Patagonia Mts. of southern Arizona,[37] and Lemmon's Nos. 10 and 94 (not 294) were collected at Tucson, Ariz., in August, 1880.

CHAMÆSARACHA CORONOPUS Gray, in Brew. & Wats. Bot. Cal. 1.540.

The range of this species is extended to California by Rydberg[38] on specimens by W. F. Parish, of 1884, which, however, were collected in Arizona.

PENTSTEMON CLEVELANDI Gray, Proc. Am. Acad. 11: 94.

This is a plant of low altitudes in the cañons of the mountains bordering the Colorado Desert. Parry & Lemmon's collection of it, erroneously cited "from near San Bernardino,"[39] probably came from Palm Springs, or thereabouts.

PENTSTEMON LÆTUS Gray, Jour. Bost. Soc. Nat. Hist. 7:147.

Wallace is said to have collected this "near Los Angeles,"[40] but it is doubtful if it occurs so far south, or at such a low altitude. Blue flowered forms of *P. heterophyllus* Lindl. have been taken for it by some recent collectors, and are abundant at Elizabeth Lake, Sand Creek and elsewhere.

MIMULUS PALMERI Gray, Proc. Am. Acad. 12: 82.

"On the Mojave River, *Palmer*," is the type-locality given for this plant. It is species of wet meadows in the San Bernardino Mts., at 5,000 to 6,5000 ft. alt., and in some of these Dr. Palmer must have collected his type.

ORTHOCARPUS LASIORHYNCHUS Gray, Proc. Am. Acad. 12: 82.

The same type-locality as above is given for this species; it has the same range, and the same correction applies to it also.

ORTHOCARPUS PARISHII Gray, Pro. Am. Acad. 17: 229.

The type-station of this species, erroneously given as "San Jacinto Mts.," should be: Meadows near Stonewall Mine, in the Cuyamaca Mts.

SAMBUCUS CANADENSIS MEXICANA Sargent, Sylva 5: 38. *S. Mexicana* Presl in DC. Prodr. 4: 328.

Authors give this tree a range, in the United States, from

36 Rydberg, P. A l. c. 331.
37 Greene, E. L. Bull. Torr. Club, 9: 112.
38 Rydberg, P. A. l. c. 371.
39 Gray, A. Syn. Fl. II. 1:265.
40 Gray, A. in Brew. & Wats. Bot. Cal. 1;561.

southern Mexico and Arizona to southern California. *S. velutina* Dur. & Hilg., which is usually reduced to a synonym of *S. Mexicana*, extends from Posé Creek, in the southern part of the San Joaquin Valley, as far north as, perhaps, Plumas County.[42] I do not, however, find any evidence of its existence between the Tehachipi Pass and the south-eastern boundary; a remarkable hiatus if the above identification is well founded; nor is the genuine *S. Mexicana* known to reach California.

MEGARRHIZA MARAH Watson, Proc. Am. Acad. 11: 138.

This has been reported from Santa Catalina Island as collected by Baker[43] and by Lyon.[44] But Baker's specimen, in the Gray herbarium, is a mere sterile scrap, and Lyon's is not in existence. Probably their plants were *Echinocystis macrocarpa* Greene.

CALYCOSERIS PARRYI Gray, in Torr. Bot. Mex. Bound. 106.

The type-locality of this species was given as "Mountains east of Monterey." It is, however, a strictly desert plant, and its range, as correctly stated in the Synoptical Flora, is from the Colorado Desert to Utah.

ERIGERON CORYMBOSUS Nutt. Trans. Am. Phil. Soc. 7: 308.

This is reported as collected by Dr. Cooper on "the eastern slope of Providence Mountain."[45] The specimen is said to be incomplete and it is hardly possible that this northern plant should occur in that desert range.

LAYIA CARNOSA Torr. & Gray, Fl. 2: 394.

Nuttall is said to have collected this plant "on the sands of the sea-beach, at San Diego." Either it has become extinct at that place, or there is a mistake as to Nuttall's locality. In recent times botanists have found it on sea-beaches from Marin County as far south only as Monterey.[46]

CHÆNACTIS HETEROCARPHA, Gray, Pl. Fendl. 98.

The Synoptical Flora gives this plant a range from Lake to San Bernardino County. The southernmost specimen in the

41 Gray, A. Syn. Fl. I. 2; 9.
42 Greene, E. L. Fl. Franc. 342.
43 Brewer & Watson, Bot. Cal. 1: 241.
44 Lyon, W S. Bot. Gaz. 11: 333.
45 Gray, A. in Brewer & Watson, Bot. Cal. 1: 329.
46 Greene, E. L. Fl. Franc. 429.

Gray herbarium is from Santa Clara River, in Ventura County, and there is no evidence that it extends further south.

PECTIS PAPPOSA Harv. & Gray; Gray, Pl. Fendl. 62.

Dr. Watson quotes "Rattlesnake Island, harbor of San Diego, W. J. Fisher," as a station for this species, referring for authority to Kellogg, Proc. Cal. Acad. 7:162.[47] Dr. Kellogg's note at this place is appended to his character of *Tribulus Fisheri*, a plant from Agiabampo, below Guaymas, Mexico, and the Pectis presumably came from some San Diego in that region. There is no "Rattlesnake Island" in the harbor of the Californian San Diego. *Pectis papposa*, however, has been collected at several places in the south-western part of the Colorado Desert.

PECTIS PUNCTATA Jacq. Stirp. Am. t. 128.

The Synoptical Flora credits this to southern California by an evident typographical error for Lower California. There is a specimen in the Gray herbarium from Cape San Lucas, but none from the state of California.

ARTEMISIA PARISHII Gray, Proc. Am. Acad. 17:220.

The second station, "Cajon Pass," given in the original description is an error. The plant has been found, as yet, only at Newhall.

CNICUS DRUMMONDII Gray, Proc. Am. Acad. 19:40.

The writer recently noted the presence of this species at Warner's Ranch, having mistaken for it specimens of *C. Hallii* Gray. The variety *acaulescens* is common in the mountains of southern California, but the species itself apparently does not reach them.

47 Watson, S. Bot. Cal. 2:458.

NOTES ON ALGÆ. I.

WILLIAM ALBERT SETCHELL.

The writer published in the late journal Erythea, three sets of "Notes on Cyanophyceæ." He now proposes to continue these with the addition of material drawn from all groups, under the above heading. He will attempt in this connection to give occasional accounts of what is being done in the way of increasing our knowledge of the Algæ of the Pacific Coast, in particular, both in the way of discoveries and published accounts or specimens.

Laminaria ephemera Setchell mss. Plant vernal, apparently disappearing in the early summer. Holdfast discoid or nearly so, small. Stipe slender, 2 to 16 cm. in length, terete below, sometimes slightly flattened above, without mucilage ducts. Blade narrow, linear to linear-obovate in general outline, narrowly cuneate at the base when young, but rounded and almost cordate when older, split deeply longitudinally into from two to several narrow divisions, and reaching a length of 60 cm., without any sign of mucilage ducts. Sori covering the blade, in more or less longitudinal lines (vittate in appearance in some specimens), extending up from a solid basal portion, with ordinary Laminarioid paraphyses and sporangia.

Carmel Bay, Monterey County, California, *Mrs. J. M. Weeks!*, *C. P. Nott!;* April to June.

HEDOPHYLLUM *gen. nov. Laminacearum* Setchell mss. Plants at first like Laminariæ of the digitate section, with holdfasts and very short stipes soon becoming attached to the substratum through hapteres given off from the decumbent, expanding, basal margins, which in one species become decidedly thickened. Blade at first simple, becoming more and more digitate as it increases in diameter, at times more or less cucullate, but without auricles at the bases of the segments.

Hedophyllum sessile (Ag.) Setchell mss. Fronds ample, bases not thickened, the blades becoming absolutely sessile on the rocks, 30 to 50 cm. long, the surfaces either perfectly smooth or with irregular bullate swellings scattered over them in

the case of those plants growing near high-water mark. Stipe of the young plant very short and much flattened, soon disappearing. Blade at first ovate and entire, soon splitting deeply, even to the very base, and becoming decidedly cucullate, with frequent, large mucilage ducts. Sorus unknown.

More or less common on smooth rocks, in the littoral zone, on exposed shores from Fort Ross, Sonoma County, California, to Puget Sound. Fort Ross, *W. A. Setchell!;* Trinidad, California, *C. M. Drake!;* Esquimalt, British Columbia, *Dr. Lyall* (*fide* Harvey), *W. A. Setchell!;* Victoria, British Columbia, *Miss J. E. Tilden!;* Whidby Island, Washington, *N. L. Gardner!*

This species is the *Laminaria sessilis* Ag. and the *L. apoda* Harv. It has been distributed under No. 344, Tilden, American Algæ (under the name of *Laminaria sessilis*) and under No. VIII, Phycotheca Boreali-Americana (under the name of *Hedophyllum sessile*).

Hedophyllum subsessile (Aresch.) Setchell mss. Frond ample, 60 to 75 cm. long and, in the adult condition much broader than long. Young plant provided with a normal holdfast, with branching hapteres and a short, stout, somewhat flattened stipe. Blade of the young plant at first narrow and simple, then broader and divided, with at length cordate base and marginal rows of bullate swellings. In the older plant, the base of the blade becomes more and more cordate, even to reniform, the basal margins begin to thicken and give rise to hapteres which attach the thickened bases to the substratum, the central portion of the blade dies away clear to the base and there is left two separated, partial blades, each borne at the extremity of a thickened basal margin which resembles very closely a running rootstock, and has been so described by Areschoug. Segments of the blade broader or narrower, somewhat cucullate at the base, but without auricles, and with large and frequent mucilage ducts. Sorus unknown.

The writer's specimens came from the Island of Amaknak in Unalaska Bay, and the species is probably common throughout the Aleutian Islands. Areschoug does not say whence his specimens of this plant was obtained, except that the inference is that

they came from either Bering Island or Sitka. The writer has seen young specimens, seeming to be this species, from the Pacific shores of Alaska, but they were not characteristic and he does not feel certain that they really belong here.

This species seems to be the *Hafgygia Bongardiana* f. *subsessilis* of Areschoug (Obs. Phyc., IV, p. 5) as far as one can tell from a description. Areschoug especially mentions the conglobated hapteres and the root-stocks emitting leaves from their apices, so characteristic of our plant.

PLEUROPHYCUS *gen. nov. Laminacearum*, Setchellet Saunders mss. Frond Laminarioid, with evident holdfast, stipe and blade, the lamina provided with a single, percurrent, median, shallow midrib-like furrow (prominent on one surface and indented on the other), without perforations or auricles.

Pleurophycus Gardneri Setchell et Saunders mss. Holdfast of two or three whorls of more or less irregularly dichotomously branched, fairly stout hapteres. Stipe about 35 cm. in length, terete at the base, becoming decidedly flattened above, with medulla elliptical in cross-section above, and without mucilage ducts. Blade 70 to 100 cm. long, and 20 to 25 cm. wide in the middle portion, more or less wedge-shaped at the base, "midrib" about 3 cm. in width, and margins more or less ruffled or even, at times, conspicuously reticulately rugose. The blade is thin, with proportionately wide medullary layer and frequent, large mucilage ducts. Sorus confined to the midrib portion, on both surfaces of the blade, extending at times from the base to near the apex. Paraphyses and sporangia similar to those of species of Laminaria.

First found by N. L. Gardner, in the summer of 1898, on the shores of Whidby Island, Wash. and by Miss J. E. Tilden, on San Juan Island, Washington; from both of which places, the writer has seen specimens. It has been found, also, at Yakutat Bay, Alaska, by De Alton Saunders. It seems to grow in the upper part of the sublittoral zone in exposed localities.

Iridæa oblongifructa Setchell mss. Frond ample, up to 5 or 6 cm. in length, cuneate at the base, narrowed into a short flattened stipe, and attached by a fairly conspicious fleshy disk, from which several fronds may spring; color deep red; substance soft

and somewhat fleshy; surfaces of the frond, especially toward the bases, delicately and closely marked with fine anastomosing wrinkles; margins of the frond repand and somewhat loosely dentate, or even closely serrulate. Tetrasporangia unknown. Cystocarps situated in the medullary layer, prominent on both surfaces, elongated oblong in shape.

Known only from a series of specimens collected by N. L. Gardner on the shores of Whidby Island, Washington, evidently cast up from deep water, attached to the stipes of kelp and perhaps other large Algæ.

This species has the frond of *Dilsea Californica* (J. Ag.) Schmitz, but the cystocarp of Iridæa. It is to be distinguished from the various forms of *I, laminarioides* Bory by the shape of the cystocarp and the markings of the surfaces of the fronds.

Callymenia reniformis (Turn.) J. Ag. This is a species of the warmer European waters, which has appeared on both the Atlantic and Pacific shores of North America. It was first detected washed ashore on the beaches in the neighborhood of Monterey and Pacific Beach, by Mrs. J. M. Weeks. The first specimens sent to the writer by Mrs. Weeks, were received in September, 1896. Later the writer found it in more or less abundance in the same localities. Both cystocarpic and tetrasporic plants are found, some of them of fairly large size, It is absolutely different in its appearance and texture from *C. Californica* Farlow, which is often found washed ashore with it. It has been found growing in water of from ten to fifteen fathoms deep, off Monterey, by C. P. Nott.

Fauchea laciniata J. Ag. This species, described by J. G. Agardh (Till Algernes Syst., IV. p. 40) from Santa Barbara, has been found by Mrs. J. M. Weeks and by the writer, cast ashore in some abundance on the beaches near Monterey and Pacific Grove. The tetraspores are in nemathecia or sori and occur in abundance on both surfaces of the frond. The sori are rather narrow and elongated, and are arranged in more or less distinctly flabellate lines, extending from near the base of the plant to the ends of the lobes. Cystocarpic plants have also been found by N. L. Gardner, on the shores of Whidby Island, Wash-

ington, thus giving this species, which has not been at all well known to collectors and students of our Algæ, a range from the Santa Barbara Channel to Puget Sound.

Fauchea Gardneri Setchell mss. Frond flabellately expanded, 6 to 15 cm. long, broad, flat, somewhat irregularly dichotomously divided, parted and lobed, the ultimate lobes, for the most part, broad, blunt, and little laciniate, or entire, blood red or very dark red, thickish and soft; composed of several layers of large colorless cells in the middle layer, becoming smaller toward the surfaces. Tetrasporic plants with finely corrugated surfaces, due to the presence of the nemathecia or sori, which are raised above the surface, and rounded and irregular in outline, thickly placed together in no regular order, but giving the surface a hieroglyphic sort of effect and occuring only on one surface of the plant. Tetrasporangia 2 to 4 (tripartitely) parted, surrounded by branched multicellular paraphyses which excrete an abundant jelly. Cystocarps sparsely scattered over both surfaces of the frond, prominent on one surface, hemispherical, without coronal processes; carpostome small and inconspicuous, apical; spore mass globular, not lobed, composed of compacted angular spores, with a distinct placenta below imbedded in the loose and regular network of filaments surrounding the spore cavity.

Whidby Island, Washington, *N. L. Gardner!*, first collected in the summer of 1898. To be distinguished from the preceding species by the less lobed and not laciniate frond, the lack of a corona on the cystocarp, and the different form and arrangement of the sori.

Odonthalia dentata Lyngb. This northern species, credited to the coast of California, but not met with by more recent collectors, has been sent to the writer from Trinidad, Humboldt County, by Mr. C. M. Drake. It is abundant in the Puget Sound region.

Bornetia secundiflora (J. Ag.) Thuret. Tetrasporic specimens of this almost exclusively Mediterranean species were found in small quantity, in March, 1897, growing on rocks near a beach, in the vicinity of Pacific Grove, California, by Mrs. J. M. Weeks. While the determination may not be absolutely certain in the absence of cystocarpic specimens, yet the structure of the tetra-

sporic plant seems sufficiently characteristic to allow it to be reckoned among the members of our Californian algal flora, to which we may expect to see added still other species of Southern Europe

Ædes nitidissima J. Ag. The membranous Rhodophyceæ, both larger and smaller, of the Pacific Coast of North America present many problems of identity, which have occupied the attention and taken much of the time of the writer for several years, The various forms and species of Dilsea, Grateloupia, Callymenia, Iridæa, etc., are very perplexing to unravel. One of the largest and most beautiful of these is the plant referred to the New Zealand species, *Ædes nitidissima*, which is abundant, at times, near Pacific Grove, and also near San Pedro, California. The frond has the shape of the typical *Iridæa laminarioides*, is rather softer and brighter red purple; more like that described for *I. punicea*, but which has the cystocarps and tetrasporangia of one of the Grateloupiaceæ. Some fronds reach a length of nearly a meter, and a breadth of from 25 to 30 cm. Both tetrasporic and cystocarpic specimens are frequent in the collections made and sent to the writer. This species was first collected on the beaches in the vicinity of Pacific Grove, by Mrs. J. M. Weeks, in September and November, 1897, and later collections were made by the writer in May, 1898. Miss S. P. Monks collected it on the beaches at San Pedro, also, in 1897: All the specimens, seen by the writer, were cast ashore, in the autumn and in the spring, after heavy storms.

The Californian specimens have been compared by Professor Farlow and the writer, with New Zealand specimens sent out by Professor Agardh, himself, and apparently of the original collection, in Herb. Farlow. *Ædes nitidissima*, then, is the third species of the same region of the southern hemisphere to be detected on our shores; the others being, *Rhodoglossum polycarpum* (Harv.) J. Ag. and *Nitophyllum Harveyanum* J. Ag. It seems likely that there are others to be discovered:

Dilsea pygmæa Setchell mss. Fronds biform, consisting of a prostrate and an erect portion. Prostrate frond tightly adherent to the substratum, at first orbicular, then more or less lobed at the

periphery, finally dying away at the center, but the margins continuing to grow and to extend, reaching a diameter of from 30 to 40 cm., thick, dull red in color, distinctly zonate, the erect fronds arising at the margins in considerable numbers, but becoming intramarginal as growth proceeds; structure of the prostrate frond of rounded colorless thin-walled cells which become narrower and more elongated above. Erect frond gregarious, short (up to 8 cm. in length), at first obovate and entire, later usually divided, even to the very base, into several narrow, cuneate or spatulate segments; color dark red to almost black above, lighter below. Tetraspores and cystocarps unknown.

Gregarious on boulders along the beach near Helmet Rock, Land's End, San Francisco, in the middle of the littoral zone. Distributed as *Sarcophyllis Californica* f. *pygmæa* Setchell, in Collins, Holden, and Setchell, Phyc. Bor.-Amer., No. 396. It is very similar to *Dilsea Californica* (J. Ag.) Schmitz, but is smaller, thicker, and with characteristic horizontal thallus.

Constantinea simplex Setchell mss. Low, simple or once forked, solitary or, at times, decidedly gregarious; stem 2 to 6 cm. long, 6 to 12 mm. in diameter, stout, annulate with the scars of fallen blades, the scars crowded, there being always much less than the diameter of the stem between any two adjacent ones. Blade, one, or occasionally two, on the same stem or branch, orbicular, 6 to 12 cm. in diameter, thick, fleshy, dull red, either entire, or soon splitting, more or less deeply, into several segments, the new blade appearing as a delicate saucer-shaped membrane in the center of the old one and gradually expanding and thickening. Tetrasporangia in irregular, extended, more or less confluent nemathecia or sori, which form a distinct zone from the margin towards the center, about two-thirds of the radius, zonate (with more or less oblique divisions) scattered among simple, slender, more or less clavate, unicellular paraphyses. Cystocarps closely crowded, in a zone similar in extent to that occupied by the sori; centripetal, in development, situated in the inner cortex of the upper surface of the blade, opening outward through the outer cortex of the upper surface by small pores, with gonimolobes confluent at maturity and separated slightly by

strings of sterile cells, provided with a curved multicellular pedicel, spores in strings, large and angular.

Growing upon rocks and stones, in the lowest portion of the littoral and the upper portion of the sublittoral zones, and cast ashore. Santa Cruz, *Dr. C. L. Anderson!*, *Mrs. J. M. Weeks!;* Pacific Grove, *Mrs. J. M. Weeks!*, *W. A. Setchell!;* Land's End, San Francisco, *W. A. Setchell!;* Dillon's Beach, Marin County, California, *W. A. Setchell* and *R. E. Gibbs!;* Fort Ross, Sonoma County, California. *W. A. Setchell* and *C. P. Nott!*

Specimens of this species were apparently referred to *C. Sitchensis* P. and R. by J. G. Agardh and by Farlow, and specimens were distributed under this name in Farlow, Anderson and Eaton, Algæ Amer., Bor. Exsiccatæ, No. 148, and in Collins; Holden and Setchell, Phyc. Bor.-Amer., No. 150.

WEEKSIA *gen. nov. Dumontiacearum* Setchell mss. Frond similar in habit to that of Callymenia, orbicular to reniform, from a short stipe and discoid holdfast, proliferating from the margins and thus producing new blades similar in shape and behavior to the original, consisting of three layers: a medullary layer of coarser and finer filaments, much intertwined, and two cortical layers, each consisting of large, rounded, colorless cells within, and outer small colored cells arranged in short filaments vertical to the surfaces. Tetrasporangia unknown. Cystocarps scattered through the frond, immersed (lying in the medullary layer, beneath a small opening through the cortex which is not at all prominent) with the spore-mass reniform, not distinctly lobed, provided with a curved pedicel composed of several cells (on its inner side) from which arise branching filaments whose outer cells develop into spores.

A genus with the habit of Callymenia, but the cystocarp of the Dumontiaceæ as understood by Schmitz. Named in honor of Mrs. J. M. Weeks, an indefatigable and discriminating collector of our Algæ, who first detected and insisted upon the distinctness of the only species.

Weeksia reticulata Setchell mss. Frond ample, broadly reniform up to 30 cm. in diameter, of a rose pink to a dark red color, soft and fleshy, adhering well to paper when drying, with many

radiating broad indistinct veins which are more plainly seen below, and which anastomose forming a distinct reticulation which becomes indistinct above and towards the margins. Tetrasporangia unknown. Cystocarps thickly scattered through the frond.

A rather rare plant, cast ashore from deep water on several beaches near Pacific Grove, where it has been found by Mrs. J. M. Weeks, M. A. Howe, De Alton Saunders, and the writer.

HEPATICAE COLLECTED BY WILLIAM A. SETCHELL IN NORTHERN ALASKA.

BY ALEXANDER W. EVANS.

The Hepaticae noted in the following list were collected during the summer of 1899. Most of the specimens came from the island of Unalaska, but a few were gathered on the island of St. Micheal and a few on the mainland, at Cape Nome. In the writer's recent report on the Alaska Hepaticae collected by the Harriman expidition, 82 species are accredited to the Territory.[1] *Gymnomitrium crenulatum* Gottsche, a species formerly known from Europe only, has since been added by Herr Stephani;[2] and, in the present list, *Aneura major* and *Jungermannia caespiticia* are reported as Alaskan for the first time. These 3 species increase the total number to 85.

Marchantiaceae.

1. CONOCEPHALUM CONICUM (L.) Dumort. Unalaska (1015, 1031, in part).

2. PREISSIA QUADRATA (Scop.) Nees. Unalaska (1017).

3. MARCHANTIA POLYMORPHA L. Unalaska (1021, 1036).

Metzgeriaceae.

4. ANEURA MAJOR (Nees.) *Aneura multifida*, var. *major* Nees, Naturgesch. Eur. Leberm. **3**: 450. 1838. *Riccardia Major* Lindb. Musc. Scand. 5. 1879. Unalaska (1023). New to Alaska.

1 Proc. Wash. Acad Sci. **2**: 290. 1900.
2 Bull. de l'Herb. Boissier, II, **1**: 143. 1901.

Dr. Howe[3] has recently reported this species from California, and the Alaska specimens, although very fragmentary, agree closely with plants which he quotes (Hep. Amer. *No. 26*). They agree also with specimens from Sweden collected by Dr. Arnell.

Jungermanniaceae.

5. MARSUPELLA EMARGINATA (Ehrh.) Dumort. Unalaska (1024).

6. NARDIA HAEMATOSTICTA (Nees) Lindb. Unalaska (1018); Cape Nome (2502).

7. JUNGERMANNIA CAESPITICIA Lindenb. Syn. Hep. Eur. 67, *pl. 1, f. 1-8.* 1829. *Aplozia caespiticia* Dumort. Hep. Eur. 61. 1874. Cape Nome (2501). **New to America.**

Dioicous: pale yellowish-green, caespitose, ♂ and ♀ plants mixed in the same tuft, stems closely prostrate with numerous whitish rhizoids, ascending at the tips, mostly simple but often innovating below the perianth and occasionally bearing a lateral branch: leaves imbricated, concave, obliquely inserted, broadly orbicular, rounded or slightly emarginate at the apex, slightly decurrent at antical base, margins entire or subcrenulate from projecting cells: leaf-cells with very thin walls, scarcely or not at all thickened at the angles; walls of marginal cells sometimes uniformly thickened along free edge of leaf; cuticle smooth underleaves wanting: leaves of ♀ stems passing gradually into the bracts; innermost bracts similar to the leaves but broader and irregularly sinuate on the margins; bracteoles 1 or 2 in number or wanting, ovate to ligulate, entire; perianth obovate and gradually narrowed to a contracted, minutely crenulate mouth, obtusely 4 to 5 keeled in upper part, 1 cell thick except in basal fourth; archegonia about 6: ♂ bracts mostly in 2 to 5 pairs, similar to the leaves but a little smaller and more concave, sometimes bearing a small bluntly pointed tooth near the antical base; antheridia borne singly or in pairs on short stalks; capsule spherical, purple, borne on a short stalk and tearing the perianth irregularly upon emerging; spores minutely verruculose, brownish-red: elaters bispiral, bluntly pointed.

Stems 0.35 mm. in diameter, robust leaves 0.6×0.8 mm., leaf-cells at edge of leaf 32 μ in diameter, in the middle 35 μ and

3 Mem. Torr. Bot. Club, 7:72. 1899.

at the base 55×35 μ, innermost ♀ bracts 1×1.4 mm., perianth 1.7×1 mm., spores 10 μ in diameter.

Jungermannia caespiticia is a well known European species and probably has an extensive range in the northern parts of America. It nearest relatives are perhaps *J. sphaerocarpa* Hook., which is already known from Alaska, and *Nardia crenulata* (Sm.) Lindb., which is to be expected in the southern parts of the Territory. In *J. sphaerocarpa* the inflorescence is monoicous instead of dioicous, and the leaf-cells have distinct though sometimes minute trigones; the cells moreover are smaller than in *J. caespiticia*, averaging in a Swedish specimen collected by Dr. Arnell, 21 μ on the edge of the leaf, 23 μ in the middle and 30×23 μ at the base. In *Nardia crenulata* (which might very justly be retained in *Jungermannia*), the ♀ bracts are slightly adherent to the base of the perianth, and the leaves or, at any rate, the bracts are distinctly bordered with a single row of large thick-walled cells. The cuticle of this species also is minutely striate-verruculose.

8. JUNGERMANNIA ATROVIRENS Dumort. Unalaska (1022, 1026).

9. LOPHOZIA INCISA (Schrad.) Dumort. Cape Nome (mixed with 2500).

10. LOPHOZIA INFLATA (Huds.) M. A. Howe. St. Michael (1801).

11. LOPHOZIA ATTENUATA (Lindenb.) Dumort. Unalaska (mixed with 1030).

12, LOPHOZIA FLOERKII (Web. & Mohr) Schiffn. Unalaska (mixed with 1016).

13. PLAGIOCHILA ASPLENIOIDES (L.) Dumort. Unalaska (1030).

14. CHILOSCYPHUS POLYANTHOS (L.) Corda. Unalaska (mixed with 1021).

15. CEPHALOZIA DIVARICATA (Sm.) Dumort. Unalaska (mixed with 1016).

The specimens show ♀ flowers with occasionally an immature perianth. On some of the stems, the upper leaves are more than one cell thick near the base and occasionally exhibit on the outer

surface cellular projections in the form of irregular and rudimentary ridges, lamellae or spines. These peculiarities indicate an approach to the recently proposed *C. asperifolia* C. Jensen from Greenland[4] but they are so inconstant and so slightly marked in the Alaskan plants that these should hardly be separated from *C divaricata*. The writer is led to this conclusion partly through the examination of Dr. Howe's variety *scabra*[5] of this most variable species. In the extreme forms of this Californian variety, the leaves are distinctly spinose on the back, and yet these forms are connected with typical smooth-leaved *C. divaricata* by intermediate conditions.

16. BLEPHAROSTOMA TRICHOPHYLLUM (L.) Dumort. Unalaska (mixed with 1017 and 1038).

17. ANTHELIA JULACEA (L.) Dumort. Unalaska (1029.)

18. PTILIDIUM CILIARE (L.) Nees. Unalaska (1034, 1037); St. Michael (1800, 1802.)

19. DIPLOPHYLLEIA TAXIFOLIA (WAHL.) Dumort. Unalaska (1038); Cape Nome (mixed with 2500 and 2502).

20. SCAPANIA UNDULATA (L.) Dumort. Unalaska (1019 and 1020, a large purple form; 1035, a green form.)

21. SCAPANIA CURTA (Mart.) Dumort. Unalaska (1016). Immature specimens from St. Michael (1803 and 1804) are also doubtfully referred to this species.

22. RADULA BOLANDERI Gottsche. Unalaska (1025).

23. RADULA COMPLANATA (L.) Dumort. Unalaska (1027).

4 Medd. om Gronland, **15**: 371. f. 15. 1898. The name of this species is not tenable, since there is an older *C. asperifolia* (Tayl.) Spruce (Hep. Amaz. et And. 508. 1885, foot-note) from the Madeira Islands (*Jungermannia asperifolia* Tayl. Lond. Jour. Bot. **5**: 277, 1846 *Anthelia asperifolia* Spruce, On Cephalozia, 83. 1882).

5 Mem. Torr. Bot. Club, **7**:129. 1899.

YALE UNIVERSITY.

SOME CALIFORNIA PLANTS.

J. W. CONGDON.
(Mariposa, Cal.)

ECHINOCYSTIS IN CALIFORNIA.

The California species of Echinocystis have long been recognized as unusually difficult to distinguish. This arises from the fact that the plants are very much alike in flowers, foliage and habit. They bloom in the early spring abundantly, but the fruit is often very scarce and scanty. It is frequently very difficult to identify the barren or scantily fruiting plants in June with the forms that furnished the blossoms. This is especially true where two or more species grow in the same neighborhood.

Having been enabled during the last and present seasons to obtain for the first time really satisfactory materials, I trust readers may derive benefit from my observations.

As a means of classifying our species, I recognize the value of Professor Greene's test of the shape of the corolla which so far as I know holds good throughout.

I should, therefore, arrange and distinguish the California species known to me as follows:

Corollas Rotate.

E. FABACEA Naud. Climbing over low trees or bushes, or trailing. Sterile flowers in small, scarcely branching racemes, greenish white. Fruit globose or ovoid, 1 to 2 inches in diameter, usually two-celled and about 4 seeded. Seeds obovoid, somewhat compressed.

Var. **agrestis** trails on the ground, is much smaller and has smaller, scarcely prickly fruit.

This species with its variety is common along the whole coast of California, and extends into the interior as far as the foothills.

E. MACROCARPA, Greene; seems to differ from the last, principally in the much larger fruit and the more numerous and differently shaped seeds. It belongs to the southern coast.

E. inermis. Plant entirely glabrous, climbing high. Leaves large, thin, deeply-lobed, the lobes with large rounded sinuses. Sterile flowers bright white in divaricately branching panicles 6 to 8 inches long. Fruit globular, 2 inches in diameter, very weakly muricate, 4-celled, cells 1-seeded. Seeds oblong-obovoid, scarcely at all compressed. So far, only found at Sherlocks, Mariposa County, but it is very probably not rare in the foothills.

Corollas Campanulate.

E. MARAH Kell. A luxuriant climber. Leaves very broad dark green. Corollas bright white, large for the genus. Sterile flowers in branching panicles 6 to 12 inches long. Fruits ovoid 3 to 4 inches long, tapering at both ends, weakly muricate, 2 to 3-celled, several to many-seeded. Seeds circular, flattened, nearly an inch in diameter, a third of an inch thick in center, thinner on the edges.

This species belongs to the coast region, around San Francisco Bay, and is especially marked by the peculiar seeds.

E. HORRIDA Congdon. Plant glabrous, climbing high. Leaves usually with short, triangular lobes and acute sinuses. Sterile flowers, bright white in elongated, scarcely branching racemes, 4 to 6 inches long. Fruit very large, ovoid or oblong-ovoid, rounded at the ends, 4 to 6 inches long and 2 to 3 inches in diameter, strongly muricate with stout spines, usually 4-celled, 8 to 10-seeded. Seeds oblong-ovoid with one end terete and the other decidedly compressed.

This is the common species of our foothills, but it fruits so rarely, that it was not until last year that good fruit, sufficiently identified as belonging to this (with us) common species, was obtained.

E. MURICATA Kell. This is a more slender species than any of the others, with smaller, usually sinuately lobed leaves. Flowers small white. Sterile flowers rather few in slender racemes. Fruit sometimes glabrous, usually muricate with a few weak spines. Seeds almost globular, half an inch or more in diameter. This species seems confined to the foothills north of Tuolumne County.

The principal points upon which, as it seems to me, we can

rely in distinguishing the species, are the shape, size and (*E. fabacea*) the color of the corollas, the simple racemes or branching panicles of the sterile flowers, and the shape of the seeds. The leaves show differences but they are not so clear nor apparently so reliable as the distinctions above noted.

TWO NEW SPECIES.

Hemizonia (Calycadenia) seciosa. Plant 2–4 feet high, very branching, with very slender, spreading, almost wholly glabrous, branches and branchlets. Tack-shaped glands few, principally on the tips of the very small leaves in the branchlets. Stem leaves narrowly linear, about an inch long, thickish, entire, usually puberulent, with strong white midvein. Heads not involucrate, solitary at the ends of the branchlets which are often 3 or 4 inches long, pale yellow, showy. Involucre consisting of 10–15, more or less, imbricated bracts, which are oblong varying to oblong-spatulate in shape, thickish and stiff in texture, with more or less glaucous bloom, the inner and larger series scarcely connate, abruptly truncate with cuspidate ciliate tips. Rays about 5, nearly an inch long. Disk flowers 10–20, infertile, without pappus. Akenes blackish, obovoid-triangular, somewhat curved, with wholly smooth but deeply wrinkled and pitted surfaces.

A showy species, allied to *H. truncata* Gray, but very distinct. Open fields near Roseville, Cal.

Muilla tenuis. Corm ½ inch in diameter, about an inch deep in the ground. Stem very slender with membranaceous sheaths at base, 6 to 12 inches high. Leaves filiform, of extreme tenuity, 3 to 6 inches long. Umbel 12–15-flowered. Pedicels very slender about an inch long. Bracts at base of umbel 4–6, 3–4 inches long, long-acuminate. Flowers about 2 lines in diameter, whitish. Sepals oblong, obtusish, the wide midvein of a yellowish brown. Filaments filiform. Anthers oval, versatile. Capsule depressed-globose, slightly 3-lobed. Seeds few, flattened on one side, irregularly angled.

A very slender species differing from *M maritima* in the extreme slenderness of all its parts and the different sepals. Foothills, Raymond, April.

SHORT ARTICLES.

PLANTS USED FOR POISONING FISH. *Datisca glomerata* Benth. & Hook. has recently been sent to the Herbarium of the California Academy of Sciences by Dr. J. W. Hudson of Ukiah with this note; "This plant grows in stony places along the banks of creeks and is somewhat rare in Mendocino County. It is called Wéum Kalí by the tribe of the Pomas, known as Yokaia, and is employed by these Indians to poison fish in the same manner as Amole (*Chlorogalum Pomeridianum* Kunth.) or Turkey-mullein (*Eremocarpus setigerus* Benth.)" The Spanish name for the latter is Yerba del Pescado. The leaves and stems are dried and powdered and the powder is scattered in the streams. The fish are stupified and rise to the surface of the water so that they can be easily captured by the hands.

According to Mr. C. H. Townsend, who was on the expedition to the South Sea Islands with Professor Alexander Agassiz in U. S. S. Albatross, the natives of the Tonga Islands have a plant which they use in a similar manner to catch the fish in the sea.

Padre F. Manuel Blanco in Flora del Filipinas gives an account of the use of *Menispermum cocculus* L. for the same purpose. The seeds of this plant are crushed and rubbed together with any species of cray-fish or mussel which the natives find on the beach. This is strewn in small pieces in the water. After twenty minutes the fish who have eaten of this mixture are either dead or dying and rise to the surface of the water, when they can be taken out with the hands. Fish killed in this way may be eaten without any harm as the old Padre himself proved by eating of the fish so killed.

ALICE EASTWOOD.

ATRIPLEX SEMIBACCATUM R. BR. in Marin County. This species of Atriplex has been introduced into cultivation in California through the Agricultural Experiment Stations of the University of California. Professor E. W. Hilgard, the head of the Agricultural College, has for years been trying to find plants that could be used as forage plants and which could be cultivated in the alkaline lands of this State. Through the kindness of Dr.

Ferd. von Mueller seeds of several species of Atriplex were received from Australia of which this proved to be the best. It was particularly successful at the station at Tulare and seeds raised there were distributed throughout California. There is a specimen in the Herbarium of the California Academy of Sciences received from Mr. A. B. Leckenby who was at that time attached to the Kern County Land Company's Experiment Station at Bakersfield, and who raised the plants from seed received from the station at Tulare.

In August of the present year, the author found this plant growing on the edge of the salt marsh not far from Larkspur and apparently flourishing. How it came there is not known, but as it may eventually become widely spread along the marsh lands of Marin County, this first record of its appearance is of interest.

ALICE EASTWOOD.

HABENARIA MARITIMA Greene. This species which was first collected: "On dry hills near the sea at Point Lobos, near San Francisco" (Pitt. II. 298). is also found near Lands End, San Francisco, on rocky banks and cliffs. The author has collected it also on the hills of Sausalito and near Point Reyes.

A very interesting form was sent to the Herbarium of the California Academy of Sciences recently by Mr. William Barber of Ross Valley. This grew in the woods instead of on exposed hillsides and differed from the typical form in having stems 1–2 feet in height, spikes of flowers nearly a foot in length, more loosely flowered with longer and greener bracts. The flowers also were larger and both petals and sepals somewhat greener. In shape the parts of the flower were identical, both showing ovary with three spiral ribs. The differences, while apparently sufficient to constitute a good variety, are such as one would expect to find a plant exhibiting as a result of more favorable surroundings and more abundant nutriment. The comparison of the two forms was made from fresh flowers. The honey scent was not so strong in the sylvan form as in the maritime.

ALICE EASTWOOD.

VERBASCUM IN CALIFORNIA. The Great or Woolly Mullein *V. Thapsus* L. noted in Bot. Cal, ii, 472 as having been found in Siskiyou County by Mr. Greene has been known to me since 1854. It was then sufficiently common in fields of Sacramento County near the prosperous mining town of Prairie City, of which no vestige now remains. In the year 1859, it covered a tract several hundred feet in length along the American river, between the town of Folsom and the place where the Branch State Prison now stands.

V. virgatum With. I saw first near Pasadena in the year 1885, but I had observed *V. Blattaria* L. not far from Stockton in 1876. These two plants are usually considered doubtfully distinct. In their extreme forms they appear sufficiently so, though the only real difference appears to be in the pedicels which are shorter than the calyx and clustered in *V. virgatum*, longer and usually solitary in *V. Blattaria*. The forms found in northern California frequently have the appearance of intergrades.

The first and the last species most probably came to us by way of the eastern states, where they are weeds, but *V. virgatum* seems to have come to us direct from Europe. Dr. Gray in the Synoptical Flora suggests that it came by the way of Mexico but the plant is not certainly Mexican unless, as is often the case, it is included in *V. Blattaria*.

K. B.

THE SIZE OF HERBARIUM SHEETS. In a large and growing herbarium the item of paper upon which the specimens are to be mounted is of considerable consequence, but of more importance still is the space to be occupied and the size of the shelving. Herbaria which have already accumulated a large number of mounted specimens of a certain size are never likely to change, but in the new ones which are formed from time to time it is well to consider whether the saving in expense and space, and convenience in handling, does not outweigh any possible advantage in conforming to a "standard" which as is well known was the result of a blunder. Dr. Gray in the American Journal of Science for 1841 makes note of the size of sheets in the great herbaria of Europe. The magnificent Banksian Herbarium, which is apparently the one he selected as a model, is 16½ ×

10¾. The great Candollean Herbarium at Genevea is 10×15, which is ample and would even be improved in proportion by taking an inch from the length. The herbarium of Linnæns (which was of course determined as to the sheet by convenience) is of "foolscap" size, 8×13 inches, a most ungraceful shape. For local herbaria, however, an inch added to the width would make it of sufficient dimensions.

In former times it was sometimes difficult to cut ordinary commercial papers into certain sizes without a great deal of waste, but now through Herbarium Supply Companies, paper of almost any size can be obtained without this element of expense.

In the Harvard Herbarium, much the most important of the American collections, the sheets are mostly well filled—various collections of the same species, with their labels being glued upon the same sheet until it is filled. The effect is often less ornamental, but much more convenient, and the saving is considerable. Where the specimens are very small, however, the effect is better, the apearance of a small dab of Tillæa, Pilularia, or other minute plant in the middle or in one corner of a vast expanse of paper outrages one's sense of fitness. The only excuse for it is lack of time for the perfect determination of the specimens to be mounted; on which account it might be well in large herbaria to increase the force of botanists, somewhat if necessary at the expense of the number of minor employees. In mounting small specimens of different collections to fill a sheet it may occasionally happen that more than one species is represented, even under the oversight of a careful botanist, but this is a trivial matter of small inconvenience.

In whatever manner plants are mounted provision should be made on the sheet for a folder containing fragments for lending. Few botanists can spare the time to go from one herbarium to another often at great distances, to consult types, and many plants, especially if mature, travel badly, and types are loaned, if at all, with great reluctance, yet the need of these originals is so great in revisions and monographs that some effort is usually made to render them available.

K. B.

RECENT LITERATURE.

A Synopsis of Mexican and Central American Umbelliferæ. By John M. Coulter and J. N. Rose, Proc. Wash. Acad. Sci. vol i, pp. 111–159. Jan. 8, 1900, Pl. 1–12.

Monograph of the North American Umbelliferæ. By John M. Coulter and J. N. Rose, Contr. from the U. S. National Herbarium vol. vii, No 1. Dec. 31, 1900. Pl. 1–9.

The second of these papers should have included in the title "North of Mexico," for it stops at our southern border. The two papers taken together represent the Umbelliferæ of North America so far as known, and are invaluable to the working botanist. They show the painstaking care for which the authors are so well known. The genera are arranged as in Engler & Prantl's *Pflanzenfamileen*, "which is by far the most masterly presentation of the group which has yet appeared." The work of Drude is, however, very much more conservative than the one under notice.

In the Mexican Flora the number of genera and of endemic species have been nearly doubled since the publication of Hemsley's Biologia. In the flora north of Mexico covered by the Monograph 30 genera and 150 species have been added to the number in the Revision by the same authors in 1888. The changes made are sweeping in character, Peucedanum, Selinum and Velæa are excluded from our flora; Centella is separated from Hydrocotyle; Osmorrhiza and Glycosma are retired in favor of Washingtonia; Musenium is changed to Musineon; the species formerly under Deweya are, with the exception of *D. arguta*, referred to a new genus, Drudeophytum; Leptocaulis becomes Spermolepis; Deringa takes the place of Cryptotænia; Tænidia is substituted for *Smyrnium integerrimum;* Discopleura is changed to Ptilimnium; Crantzia to Lilaeopsis; Phellopterus Benth. is changed to Glehnia, while Phellopterus Nutt. is applied to one of the 6 genera into which Cymopterus is divided; Tiedemannia is changed to Oxypolis; Peucedanum, as to the American species, is divided between Lomatium, Euryptera and Cynomarthrum.

Some of these changes are not likely to be concurred in. Rafinesque's Lomatium (there is a valid Lomatia in another order) seems to me quite inadmissible even if one should grant the propriety of dividing up Peucedanum. No type exists, and the description does not agree with any known species, so that Rafinesque's meaning can only be (and doubtfully) reached by process of exclusion. Spermolepis Raf. appears to have no type species—at least no specific name by Rafinesque is cited.

The substitution of Washingtonia Raf. 1818 for the long-used Osmorrhiza Raf. of the same vear, or rather the taking up of Britton's substitution, though under protest, seems to me wholly unjustifiable. The changing of names after nearly a hundred years of use for the most fanciful of causes is bad enough but in this case there are especial reasons against the change. Washingtonia has been applied to two plants in cultivation—a Conifer and a Palm—the latter is in all catalogues as *W. filifera*; and it cannot be necessary to point out the extreme inconvenience of changing names in common use by the non-botanical public.

Of the species little can now be said but in hardly any of our plants are field studies more imperatively demanded, and it is quite apparent that many of them have slighter claim to the rank than the older ones. One of them in particular, *Leptotænia humilis* is so very like *L. anomala*, collected by myself, that they can scarcely be distinct. They come from the same general region, at the base of the Sierra Nevada foothills. Carbondale is not in the "Monte Diablo Region" as is said, but near Ione, Amador County.

Catalogue of North American Plants, north of Mexico. By A. A. HELLER. Second ed. 1900.

Herbarium check lists are scarcely legitimate subjects for botanical criticism, but this one differs from others in attempting an entirely botanical function, the changing of names. In this work it is true that it is done in an entirely perfunctory manner, without regard to the claims of the varieties which he raises to specific rank or to the value of the species transferred—without

even taking such slight trouble as to consult the Kew Index—witness his *Lotus diffusus.*

The author prophesies that "at the present rate of activity in taxonomic botany, the year 1905 will see 20,000 plant names to be listed." No doubt this will be the case if all the varieties and forms are named and listed, as well as the synonyms and many Mexican plants. As examples of how this can be done, one may take *Mentha Canadensis* and its synonym *Micromeria purpurea; Mimulus atropurpureus* and *Eunanus Kellogii; Plagiobothrys rufescens, P. Californicus and P. campestris; Trichocoronis Wrightii T. riparia*—and twenty-four pages away *Biolettia riparia; Pentachæta exilis* and *P. aphantochæta*, etc. These have all been published and admitted synonyms; the author of a check list cannot be expected to know those which have not been as, for instance, *Dicranocarpus parviflorus* and *Wootonia parviflora; Orochœnactis thysanocarpha* and *Bahia Palmeri.* Of the Mexican plants included, one, *Hesperelea Palmeri* certainly is sufficiently out of the way.

And after all the striving for "uniformity of treatment" this list, only a few months old, is hopelessly behind the changes in genera and species, which may be taken as a warning to refrain from check lists until American botanists have found their judgment. K. B.

Flora of Western Middle California, by WILLIS LINN JEPSON, Assistant Professor of Botany in the University of California, 625 pages. Issued April 16, 1891. This is the best of the Local Floras which have so far been published in California. It covers practically the same region as Prof. Greene's "Manual of the Bay-Region Botany", but overruns its borders somewhat irregularly, therefore including many more species. The peculiar nomenclature which distinguished the work of Prof. Greene has not been adopted for the present work, but some not very desirable vestiges of his untenable generic names appear.

Much attention has been given to the keys, which appear to have been carefully worked out, especially the specific ones.

The author's extensive field studies have resulted, as compared with much recent botanical work, in a very commendable con-

servatism. How thoroughly he differs from the prevailing species-monger may be noted in the following extract from his preface:

"The beginner should never forget that the same species may be of quite different appearance in different localities. Soil, exposure, altitude, humidity, distance from the ocean, influence very greatly the habit and aspect of the plant. Vegetative characters (that is characters of the root, stem, foliage, size of the plant or of its various parts, amount of pubescence) vary endlessly in many plants. Hence it is well to rely chiefly upon the reproductive organs, namely the flower and the fruit, rather than upon merely vegetative characters.

The variation of the plant from its normal appearance may often be correlated with its situation, at least as to the vegetative features. The following classes of localities may be noted under this head:

1. Near the ocean a species is often more depressed or condensed than in the interior, and more fleshy.

2. In swamps or wet soils the plant tends to become succulent and of ranker growth, and also glabrous.

3. In valley soils the growth is commonly much more rank than elsewhere.

4. On hilltops plants tend to become dwarf and acaulescent; often far more pubescent also.

5. In saline or subsaline soil the stems and foliage in many species are far more vigorous and the flowers larger than on stiff clays or adobes.

6. In shady woods leaves become thinner and larger, often conspicuously so.

7. At high altitudes the flowers are larger in proportion to stature and brighter in color."

The following new species and named varieties appear in the work—the grasses by Mr. J. Burtt Davy, the others by Prof. Jepson: *Agropyrum "arenicolum"*, *Elymus pubescens*, *E. hispidulus*, *E. glaucus Jepsoni*, *E. g. breviaristatus*, *E. g. maximus*, *E. divergens*, *E. angustifolius*, *E. a. caespitosus*, *Thelypodium Greenei*, *Ceanothus purpurea*, *Cotyledon Plattiana*, *C. laxa Setch-*

ellii, C. cæspitosa paniculata, Potentilla Californica Carmeliana, Trifolium columbinum argillorum, Boisduvalia campestris, Eryngium Californicum, Angelica tomentosa elata, Convolvulus luteolus solanensis, Castilleia spiralis, Plantago Patagonica rosulata, Nemophila venosa, Allocarya salina[1], *Monardella viridis, Plectritis glabra, P. Davyana, Eriophyllum idoneum, Grindelia robusta Davyi, Erigeron Setchellii, Corethrogyne viscidula Greenei, Aster Chilensis media, Scirpus robustus compactus, Mimulus Langsdorffii Californicum, Boisduvalia densiflora montanus.* Several of these species are, however, considered somewhat doubtful by the author.

Within the limits set by the author, bounded on the north by the counties of Mendocino, Lake and Colusa; on the south by Merced, San Benito and Monterey; and on the east by the Sacramento and San Joaquin Rivers, there seems to be, in a hasty examination of the work, several omissions of recorded species; for instance: *Lysichiton Kamtschatcensis* near Boulder Creek; *Œnothera gauræflora*, near Livermore; *Glinus lotoides*, near Lathrop; *Caulanthus crassicaulis*, near Altamont; *Callitriche sepulta*, San Francisco; *Centunculus minimus*, San Francisco, Laundry Farm, Antioch; *Chorizanthe polygonoides*, Tamalpais, Laundry Farm. Of the introduced plants there are also some notable omissions, as *Ulex Europæa*, well established in Visitacion Valley, and *Taraxacum Dens-leonis*, abundant in San Francisco lawns.

Mr. Davy says under *Lamarckia aurea* that "the species appears within our limits have been found only once, near Eden Vale railroad depot, Santa Clara Co., in 1893, *Davy*." It grew abundantly on a hill between Visitacion Valley and South San Francisco, in 1890-91.[2]

Malvastrum exile Gray, though extra-limital is included, and under it *M. Parryi* Greene, is given as a synonym on the authority of Dr. Robinson, who considers the former to be the pistillate and the latter the perfect form[3] of the same species. This view of the case is discredited by the fact that through nearly all the wide area inhabited by *M. exile M. Parryi* does not occur.

1. This is another synonym of *Lithospermum glabrum*. See page 94, preceding.
2. Zoe, ii, 380.
3. Syn. Fl. i, 308.

The latter is confined to the region north of Tehachipi where *M. exile* which is spreading as a weed overlaps it. The two species are in habit and flower extremely unlike, and the carpels though similar can be readily distinguished; those of *M. exile* forming an incomplete, and those of *M. Parryi* a complete circle.

Micromeria purpurea Kell.[4] is erroneously referred to *Mentha Pulegium;* it is a synonym of *M. Canadense.*

Convovulus luteolus var. *Solanesis* appears to be the same as *C. fruticetorum* Greene.

Thelypodium Greeni is a new name for the *T. flavescens* of Prof. Greene's Manual which was by Watson[5] reduced to *Caulauthus procerus.* Dr. Jepson considers them the same species, and the new name would seem to be unnecessary.

Draba (*Heterodraba*) *unilateralis* is united with *Athysanus* as a second species—where it is not very well placed.

Helianthella castanea. Of this species the author remarks: "Fruiting heads not seen by us." I collected it at Laundry Farm a few miles from Berkeley, May 29, 1892, and considered it a hybrid of *Wyethia angustifolia* and *H. Californica.* A more recently described species, *H. Cannonæ*, has perhaps a similar origin with one different parent.

Senecio Greenei. "Mountain side near the Geysers, growing under bushes of Pickeringia and Ceanothus, *E. L. Greene*, June 17, 1874. Collected since only on Mt. Sanhedrin, Mendocino Co., *Rattan,*" has been brought thence by nearly every collector who has visited Lake County.

Microseris macrochæta, taken up under Uropappus, has been shown to be an immature state of one of the other species probably *M. linearifolia*[6] while *M. Kelloggii* given as a variety of *M. macrochæta* belongs without doubt under *M. Lindleyi. M. Clevelandi* placed as a variety under *M. Lindleyi* is the prevailing southern form of that species and is identical with *M. Parryi* (an older name) a fragment of the type of which I have seen

4. Zoe, iv, 289.
5. Syn. Fl. I, 173.
6. Zoe, i, 126.

since the article in ZOE was printed. There is some variation of course in the comparative length of the palea and awn in these species, but the great difference in favor of the awn is only found in heads in early flower.

Blepharizonia credited to Dr. Gray as a genus, is a mistake. Gray used it as a subgeneric or rather sectional, name and never believed it to be anything but "to me good Hemizonia".

A considerable greater amount of synonymy might have found place with advantage—especially the peculiar names of Prof. Greene's Manual—such as Distegia, Alsinastrum, Franca, Vibo, Oxys, Siliquastrum, etc.

Many of the recently described species have been omitted, among them may be mentioned *Cheiranthus angustatus*, *Thysanocarpus hirtellus*, *Roripa multicaulis*, *Streptanthus asper*, *Sidalcea scabra*, *S. valida*, *Astragalus Elmeri*, *Psoralea monticola*, *Lupinus eximius*, *Trifolium quercetorum*, *T. trimorphum*, *Ribes cruentum*, *Clarkia virgata*, *Arctostaphylos canescens*, *glandulosa & montana*, *Helenium occidentale*, *H. rivulare*, *Pentachæta bellidiflora*, *Xanthium Californicum*, *Pyrrocoma longifolium*, *Dodecatheon cruentum*, *Gilia Chamissonis*, *G. staminea*, *Phacelia Arthuri*, *Convolvulus collinus*, *C. fruticetorum*, *Lycopus maritimus*, *Mimulus subsecundus*, etc.

Throughout the book there is evident the most careful and painstaking proof reading and considering the difficulties encountered in a Flora of even a restricted region in California, the author is to be congratulated on having done so well. K. B.